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Analysis and Decision-making in Corporate Financing for Continuous Operations

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1. Introduction

The fast technology development and economic changes facilitate the development of financial accounting and financial management. In the fiftieth and sixties of the 20th century, the pioneers of accounting and financial management worked out a lot of theories with empirical supplementary, which play a great role in the analysis and decision-making of a firm's continuous operation. These theories support the integration of theory and practice using models from the point of view of financial management. The motive held by most financial managers is the quality should be quantified and reduced to achieve logical decisions. This motive contributes to the development of many models and methods in the scope of financial management. The different methods and models initiate that before any decision is made all possible alternatives should be analyzed and taken into consideration to achieve the best results.

If the going concern principle does not exist, there will be no more questions and discussions about continuous operation, because the liquidated value of the firm is that amount which can be realized if all assets of a firm were immediately sold for cash. Unfortunately, the above principle exists and any business organization operates with unsynchronized transactions and uncertain future so the financial managers must aware of the liabilities when they are due. The failure to maintain liquidity is, as driving a car with little oil for long distance, made complex the possibility of smooth operation of the business organizations in the given accounting period.

As the result, the dissertation will help us to be familiar with residual income model, budgeting, dynamic ratio analysis, percentages of sales, life cycle of a firm, net present value, discrimination model, throughput time, and just in time (JIT). The above models will also provide us with information that how they can be used in analysis and decision-making using accounting information.

Nowadays, the popular question of the firms is "why to go broke when a firm makes profit?" If a firm is broke, can it meet its obligations? Does it follow the going concern principle? Does the economic indicator supported by accounting information give fair information for creditors and investors? In the dissertation the related issues will be

discussed in detail and investigated the causes and problems in analysis and decision-making in the firms' financial situations.

My attempts concerning the dissertation are as follows:

- To identify problems and causes in a firm's financial analysis and decision-making. As far as Metha (1974) characteristic of current assets is accepted, purchasing resources, producing and distributing the product create cash flows that are both unsynchronized and uncertain. Cash flows are uncertain and unsynchronized, because of the characteristics of current assets. These provide us with information that the ratios originated from current assets are not better measures of liquidity. This is not the only problem discussed, but taken as an example.

- To offer a solid integration of theory and practitioner-oriented procedure for attacking the various problems confronted in the world of business environment.

- To relate how accounting information, economic data, finance theory, and statistical and operations research method can be used in a financial analysis and decision-making of a firm.

- The main objective of this dissertation is to work out the concept that is appropriate to practice and theory in the analysis and decision-making of corporate financial situation for continuous operation. Understanding the difference between profits and cash flow and how accounting profits differs from economic profits will be the best tool to management to maintain liquidity. Gallinger and healey (1991) suggested that resource allocation decisions are very important to liquidity management if insolvency risk is to be contained. The appetite for cash is voracious in even the most efficient firm, but management does not seek to hold cash, for idle cash is unprofitable cash. Hence as cash is received, it should be committed elsewhere – fore example, in the expansion of the firm, in its income-earning activities, in the distribution of dividends, in the payment of creditors. Decisions of allocating resource must be made on economic bases whether it is short or long-term investment, because both investments consume scares resources of the given firm. Short-term planning and analysis involves the determination of an optimal mixture of current assets and

current liabilities. Long-term planning and analysis encompasses essentially all decisions that has an impact over a period of one year or more, this includes the decision of a firm's long-term investment, financing and dividend policy. It is clear that service, merchandise and manufacturing business entities exist in the business world, though this dissertation investigates mainly the manufacturing firm. Nevertheless, it does not mean that the theory and practice developed in the dissertation do not work for the rest of the business entities.

- The concept of discussion is based on the current assets and current liabilities, because it is known that the current assets are more liquid items than tangible and intangible assets, and the current liabilities are due in short time, so that the timing of these items is vital[1]. The term working capital refers a firm's short-term assets, such as cash, account receivables and inventory, and its short-term liabilities, such as money owed to suppliers. Managing the firm's working capital is a day-to-day activity that ensures that the firm has sufficient resources to continue operation and avoid costly interruption. This involves a number of activities related to the firm's receipt and disbursement of cash. The monetary items (all but not inventory) are the subset of current assets and liabilities. Even though, the increase of monetary liabilities is considered as the source of finance, so attention should be given in their management.

- Systematically, the tangible and intangible assets as well as the long-term liabilities and owners' equities are built up on the discussion. As the result, the dissertation deals with the fundamental equation of accounting, which is Assets = Liabilities + Owners' equities, so the working capital management is linked with long-term financial analysis and wealth maximization for shareholders through liquidity management. This basic accounting equation also raises the discussion of sources of finance and financial decision model, when a business entity wants to expand its sales; the management must determine the required amount of external financing and to raise debt or new external equity. So the sustaining growth model helps to

[1] This dissertation deals with the analysis and decision-making of corporate finance for continuous operation, but the future is not sure that what will bring about. Therefore, the dissertation lays its thought how to manage and make decisions on the short-term financial situations in order to open path to long-term planning and decision-makings for the firm. If the short-term financial and operating problems are solved, I

determine the firm's maximum growth in sales which can be sustained without raising new external equity. The ultimate goal of a financial manager is to maximize the wealth of shareholders. Shareholders wealth can be represented as the value of the firm's collective assets. Hence, it is important for the financial manager to know how to determine the value of the firm.

- Regardless, of the specific nature of an investment opportunity under consideration, financial managers must concerned not only with how much cash they expect to receive, but also with when they expect to receive it and how likely they are to receive it. Evaluating the size, timing, and risk of future cash flow is the essence of capital budgeting. But the capital budgeting is not worked out here because it is beyond the scope of the dissertation.

- A firm's financial structure is specific mixture of long term debt and equity the firm uses to finance its operations. The financial manager has two concerns in the capital structure, first, how much should the firm borrow? That is, what mixture of debt and equity is best? The mixture chosen will affect both risk and the value of the firm. Second, what are the least expensive sources of funds for the firm? In addition to deciding on the financing mix, the financial manager has to decide exactly how and where to raise the money. The expenses associated with raising long-term finance can be considerable, so different possibilities must be carefully evaluated.

- The methods of the research is as follows:

Devoting all my time in reading the articles and books are written by famous researchers and authors in the finance and accounting literature. After understanding the theory in both literatures, I also read statistics, econometric, operation research and methods of optimization in order to write my dissertation. The dissertation is presented in certain optimum sequence in order to follow the massage of the research and to apply and use in any operating business entity. The information and methodology for financial analysis and decision-making, discusses how statistical methods, regression analysis techniques, and other related mathematical tools can be

,thought that the long-term financial and operating problems could be maintained. That is why I only focus on the element of working capitals.

used to analyze accounting information. After the development of each topic time was given to the discussion and debate for the improvement and criticism of this dissertation with well-known professors and colleagues in the university. It is attempted to accompany the different methods, models and discriminant analysis with up to date examples to analyze the necessary information.

Now it will be discussed the main contents of the dissertation. The dissertation reflects my thoughts that are explained in six parts. The first thought is the analysis and management of liquidity, which deals with major problems of accounting ratios, the difference between the economic profit, the accounting profit, and the cash flow. Here the problems are discussed briefly and suggested the required solutions. The carrying and shortage cost are explained illustrated using diagram. The important of cash cycle and recommended ratios are deeply maintained and the usefulness of residual income is also supplemented by illustration. This topic gives its main spring to the development of the consequence topics.

The second idea is short-term financial planning, which deals with working capital policy and its financing methods. The profitability and risk of working capital is attempted to discuss during the allocation of the resources. After investigating all this idea, the important of budget as method of planning and control is presented widely. It is also discussed the important of percentage of sales for forecasting the required amount of external financing.

The next thought is summarized as financial planning and analyzing, which is elaborate with the help of important models of regression analysis and linear algebra. Lev (1969) has used the concept of partial-adjustment model to define a dynamic financial ratio adjustment process. Even though his work looks older in age it has great significant in applying in dynamic ratio analysis. The well known statistical techniques of factor analysis can be used in such instance to identify important financial ratios to construct an over all financial indicator.

The fourth thought is build up on the analysis and management of cash flow that deals first with the development and preparation of accounting cash flow. But here more emphasis is given on how the analyses should be made concerning accounting

cash flow. The main objective of the cash flow statement is to provide information that allows investors, and creditors to forecast the amount of cash likely to be distributed in the future to satisfy obligations and to evaluate the probable risk. As the fact of reality, this and the next thoughts are the main parts of the analysis and managing liquidity, but they are explained as separate topics because deep and wide discussions of these topics give important information for improved liquidity and operation.

The fifth thought built in the dissertation is some problems in the trade credit. This part deals with the policies of granting credit for the given customers. The policies given by the firms determine whether to invest in inventory or no. The survey to grant credit or no is supported with important models and assumptions. Supporting credit granting differs on the size and capacity of the business entities. As the result, The credit manager has the responsibility to assess the financial situation of the firm using different methods and procedures to achieve the target of the business entity. Since credit management and policies have a close relation to inventory management, better understanding of the policies and managing credit will make simple not to deal with conventional inventory management.

The six thought is developing manufacturing technologies and accounting which has advantage over the conventional management of inventory. This part specially eases the job of accountant and improves the financial position of the firms, because it has fewer accounts concerning inventory than traditional inventory management and inventory is almost not affected by inflationary situations. This part gives more emphasis on quality than quantity.

Finally, after discussing the six topics the dissertation, it supplements with one important appendix. This appendix focuses on changing prices and its effect in financial statements and important ratios. This topic is presented as appendix, because of its importance in analysis the financial ratios and the financial soundness of the business organizations those bring to closer economic profit and cash flow of the firms.

It should also be noted that all the illustrations on the dissertation are based on the International Accounting rules.

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2. Analysis and management of liquidity

Most of the items of financial statement are related to liquidity. Therefore, I deal with the area where problems exit in analyzing liquidity. It is obvious that most firms use the annual report to evaluate the performance of the firm at the end of the year and this may not help when the firm went on bankrupt. Thus this topic deals with criticizing the conventional evaluation performance and how to keep the necessary liquidity from day to day operation of the firm, because once the firm went on bankrupt it will be difficult to look for immediate obligation. As a result, the usefulness of accounting information in liquidity analysis is conceptually and analytically evaluated.

Following Gallinger and Healy (1991) the complexity, continuity and joint nature of economic activity creates problem in measuring the effects of financial ratios and associating them with specific process, products, and time frames. Measuring the resources and obligations of a firm and measuring the changes in them are two aspects of the same problem. Management attempts to capture and understand these dynamics as they affect the firm through the use of financial statements and analysis of these statements.

The analysis of financial statements is to provide information that will support decision-makings by top managers in the financial status of the firm. Traditionally, this information is relied on financial ratio to analyze the firm's performance. The current, debt/equity, and interest coverage ratios have been firmly established in analysts' tool kits for decades. But do these mentioned ratios give a strong basis for deduce meaningful conclusions about a business entity, particularly it liquidity?

The ability of business to satisfy its short-term obligation when they come due depends on its liquidity. It is the overall financial position of business entity, which shows the solvency of the firm. Liquidity analysis is not the synonymous of the net working capital management. Net working capital management is the management of current assets and current liabilities, which is known as short-term financial analysis and planning is the subset of liquidity analysis. Current ratio and acid test (quick) ratio are the elements of working capital. Therefore, they are also the subset of liquidity analysis.

The financial ratios are generally classified according to the assets that can be rapidly turned into cash, the asset management efficiency, the degree of protection for creditors and investors, and the assets profitability. These classification as usually used are liquidity, activity, coverage, and profitability. Any of these ratios is related directly or indirectly to the liquidity analysis. However, from the point of short-term financial analysis, these classifications decline in relative of their important from the first list to the final classification.

The idea is that the current ratio is to supply a measure of safety margin in fulfilling obligations that will mature during the accounting period. But the satisfactory current ratio does not reveal the fact that a portion of the current assets may be tied up in slow moving inventories and prepaid expenses. There are also questions with inventories that how long it will take to process them into finished goods and when will be realized on the sale of merchandise.

The conventional measures of liquidity position of the firm have been recognized as current ratio, quick ratio and networking capital. However, these ratios are static, and according to Largay-Stickney (1980) and Aziz-Lawson (1989) their appropriateness for liquidity is questionable. Ohlson (1980) found that the average current of the bankrupt firms was above the mystical 2:1 standard in all five years introducing the last bankruptcy. These ratios are good when they attempt to reach the required and determined results, otherwise they may cause the bankruptcy of the firm, because their negative results will not help in managing liquidity immediately. Therefore, a dynamic liquidity measure, the cash conversion cycle approach has been introduced by Hager (1976) and has bee recommended by Largay and Stickney (1980), Kamath (1989) and other researchers in the field. As a result, this topic attempt to show how liquidity should be managed and analyzed in order to achieve better decision- making for uninterrupted operation of the business entity.

Net working capital arises from lags between the time the firm obtains the raw materials for its product and the time it finally collects its bills from customers[2].

[2] The working capital is used in as current assets through the whole dissertation.

As already mentioned working capital management is related to short-term financial analysis and planning. Specific functions included in this area on the asset side are management of the portfolio of cash and marketable securities, balancing the sometimes-conflicting goals of receivable minimization and credit policy, and the complex problem of controlling the levels of various types of inventories. On the liability side, the functions are primarily involved with the use of trade credit from the firm's suppliers and the optimal use of negotiated short-term financing.

The cash cycle is partly within management's control. As a result, it can choose to have a **higher or lower level of inventories.** Management needs to trade off the benefits and costs of investing in current assets. This will be discussed briefly under some problems in trade credit on chapter 6.

The firm's balance sheet provides information about the firm's financial structure – that is, ***the structure of its investments on the one hand and the structure of its financing sources on the other hand.*** The structures chosen should consistently lead ***to maximization of the value of the owners' interest in the firm.*** **Important components of the firm's structure include the level of investment in current assets and the extent of current liability financing.** As a result, I turn my attention to ***short-term financial decisions*** in chapter two. In the center to such decisions is ***short-term financial planning***, by which the firm specifies its intended near-term financial actions and their expected results.

An important consideration for all firms is the ability to finance recurring operations - ***the transition from cash, to inventories, to receivables, and eventually back to cash, and finally, the distribution of the surplus cash is the crucial decision concerning continued operation.*** The business operating cycle helps to discuss the **operating activities** of the firm and their impact on cash and working capital.

The basic cash balance can be calculated using the following formula:

Cash = Long-term debt + Equity + Current liabilities – Current assets (other than cash) – Fixed assets.

From the above equation it can be observed that some activities increase cash and some activities decrease it. In other words, the activities, which **increase** and **decrease** in cash, are not something than the cash inflow and outflow; those are used to be **sources and uses of funds** respectively.

The discussed equation does not show us the amount of change in each account in the given accounting period, even though the result might be the same amount as the result of the equivalent of cash. **This provides in isolating the cash account and explores the impact on cash from the firm's operating, investing and financing decisions.** This result is calculated from the cash flow statement, which will be explained briefly in Chapter 5.

If the firm is to maintain liquidity and function properly, it has to invest funds in various types of working capital during the operating period. It has to maintain cash balance to pay the bills to satisfy customer orders promptly.

Management should concentrate its affairs on shirking default situations by underline the business entity's ability to meet its obligation with cash flows from an investment of inventories and receivables within the normal course of the firm's operations. Hence, the task of managers is to give attention on the sensitivity of these operating cash flows to changing sales and earnings during periods of economic hardship and growth, because **operating cash flow coverage is the vital element in liquidity analysis.**

The maximization of shareholders' wealth as an objective of firms requires management to act as agents for creditors and investors to satisfy their interest or to fulfill enough liquidity in order to satisfy financial obligation when they are due. To keep this situation, the managers must understand the gap between profit and cash flow, and the difference between accounting profit and economic profit. Their decision is very crucial for investors and creditors as well as for the business entity.

The action of various assets and liabilities on each other is real and complex. Unfortunately, they are very well vague from the perspective of their effects on the business entity's value and on maximization of shareholders' wealth. Most financial analysts use traditional ratios such as current ratio, leverage ratio and return on

investment, ROI, calculated from the financial statements to show the complexities. The main idea of this analysis is frequently on the firm's financial coverage in the case of disaster. Under most conditions where the trouble is about to occur, such information is often useless because it is too late for management to use the information in an effort to avoid bankruptcy.

When the managers decide in resource allocation for short-term investments or long-term investments, their decision must be made on a sound economic basis. The application of different models plays a great role in the managers' decision-makings.

2.1 Some problems in analyzing liquidity

If the cash inflow and outflow were certain and known, management has no need for liquidity balances. However, managerial decisions are always made with imperfect information. Thus some level of liquid balances is required to reduce risk. A computer simulation study indicates that an optimal liquidity level does exist and that this level contributes to increasing shareholder wealth. Thus in practical operational sense management must try to find the optimal liquidity level.[3]

According to Metha (1974), there are three special characteristics associated with current assets. First, their life span does not exceed one year. Secondly, each component of current assets is swiftly transformed into other asset forms. Thirdly, a firm's operating cycle typically consists of three primary activities: purchasing resources, producing the product, and distributing the product. These activities create cash flows that are both ***unsynchronized*** and ***uncertain***.

Several cash management models can be applied to ease the productivity of cash. In spite of the model chosen, improvement in cash management is imminent, because the models,

[3] This topic is developed according to Levasseuer, M. G. the advocator of firms' liquidity in his paper "An Option Model Approach to Firm Liquidity Management," Journal of Banking and Finance, Vol.1 (1977)

in one way or another, analyze the trade-off between holding costs and ordering costs. Conjecturally, this idea is compatible with the economist's profit-maximization evidence. The credit and collection policies of the business entity play great role in the amount of investment in *account receivable* and *inventory*. Management uses credit terms for increasing price and influencing the demand curve so as to increase sales and profitability. However, profitability is of low quality if the collection period is too long. An integrative credit decision must be based on net present value that shows change of sales, production, and inventory requirements, as well as spontaneous financing that may occur.

2.1.1 Critiques of traditional ratios in terms of liquidity

When the balance sheets of many firms are observed, inventory is the largest single asset in their balance sheets. It is held in different forms to accomplish a number of objectives. As raw material, inventory provides for continuous production; as working in process and finished goods, inventory recognizes the production constraint that the product cannot be produced instantaneously.

An important question concerns the necessary level of inventory investment depends on the behavior of different structural level because of their performance. Clearly, the different functions within the firm make compromises, but if the scarce resource allocation argument is ignored, the firm may be faced for serious financial difficulties.

The task of the finance manager to persuade other managers that investment in inventory must be consistent with the shareholder wealth objectives, not with the performance of different department managers and bonuses.

The balance sheet and income statement presentations of information are questionable with regard to their benefits for understanding liquidity. It is not that the information is wrong; rather, it is that the information presented in financial statements is often inappropriate for analyzing many management problems.

The interpretation of net working capital is that if current assets exceed current liabilities, the firm is solvent. This explanation is not necessarily true, because the net working capital amount fails to indicate anything about liquidity. A high amount of net working capital may arise from flexible policy. The decision-maker must analyze net working capital in conjunction with receivables and inventory management, which frequently rely on the use of turn over ratios.

Another pitfall of net working capital concept is that non-monetary assets, such as inventories, and prepaid expenses, and a few non-monetary liabilities, such as advance receipts for services to be performed by the firm are included as if they were monetary items. This inclusion of these items is particularly disturbing if the information is to be relevant to investors and creditors in the prediction of future liquidity funds flow.

Having introduced some of the ratios associated with current asset and liability management, it is useful to return to cash management and consider the cash operating cycle. This indicates the net time interval between cash inflows from goods sold and cash outflows for the purchase of resources. It is a measure of the length of time a company has funds tied up in working capital, an increase (decrease) in the cycle indicating an increase (decrease) in working capital needs.

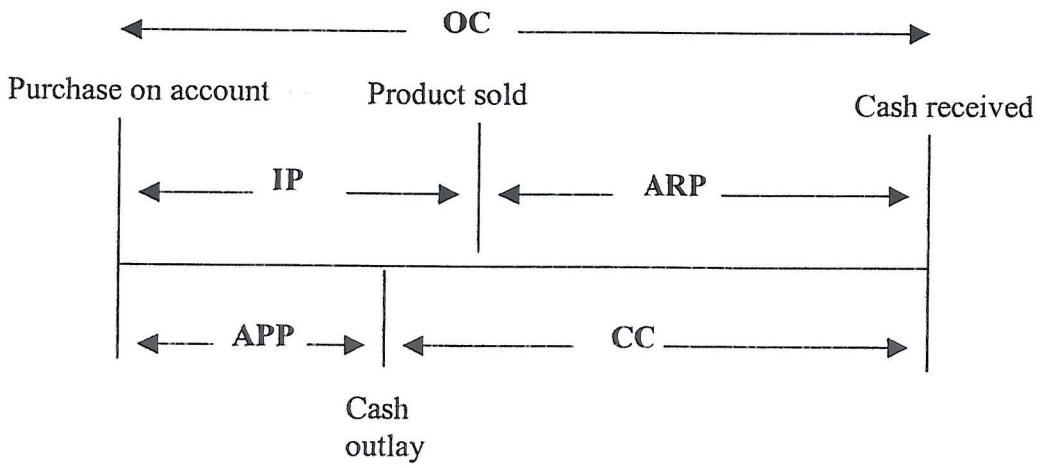

Figure 2.1

Operating and cash cycles

Source: fundamentals of financial management

The operating cycle (OC) cycle has two distinct components: the inventory period (IP) and accounts receivable period (ARP). The cash cycle (CC) is the gap between account payable period (APP) and operating cycle[4].

The turnover ratios of account receivables and inventories are rough measures of the length of operating cycle. The operating cycle notion is inadequate as a cash flow measure in that it fails to deliberate the liquidity requirements took advantage on a firm by the time dimension of its liquidity involvement.

Combining the time pattern of cash outflows needed to meet the obligation of current liabilities is as important for liquidity planning and analysis as evaluating the time pattern of cash inflows generated by changing current asset investments into cash.

The disbursement of cash for current liabilities can be embodied into the analysis by payables turnover ratio. This ratio relates operating costs requiring current cash disbursements to the accounts payable and accrued payable liabilities created by short-term deferral of these operating expenditures.

Since it is said that there is pitfall to use operating cycle as cash flow measure, as a result the receivables turnover and collection period (ARP) are also rough measures of cash flow. The information that can be reduced from these ratios is that supposedly provides some indication of the quality of the receivables and an idea of how successful the firm is in collecting its outstanding receivables, but nothing more about liquidity.

Gallinger (1991) suggested that **Bringing together accounts receivable and inventory turnover measures into operating cycle concept provides a more appropriate view of liquidity management than does reliance on the current or quick ratios as indicator of insolvency**. These additional liquidity measures clearly recognize that the life expectancies of some net working capital components depend upon the extent to which production, sales, and collections are neither certain nor synchronized.

[4] The discussion of operating cycle is based on Verlyn D. Richards and Eugene J Loughlin, " a Cash Conversion Cycle Approach to Liquidity Analysis," Financial Management (Spring 1980): 32-38.

As shown in Figure 2.1, the cash cycle depends on the inventory, receivable, and payable periods. This relation shows the integration of cash inflow and outflow patterns provide a fairly complete approach to liquidity analysis. If the inventory and receivable periods get longer, the cash cycle increase. The longer the cash cycle, the more financing is required. Changes in the firm's cash cycle are early-warning measures. A lengthening cycle can indicate that the firm is having trouble moving inventory or collecting on its receivables. Such problems can be masked, at least partially, by increase payable cycle; both cycles should be monitored to the extent that these actions can be taken without harming the return associated with the management of these accounts, they should carried out. When taking actions to reduce the inventory conversion period, a firm should be careful to avoid stock outs because stock outs could cause "good" customers to buy from competitors. When taking actions to speed up the collection of receivables, a firm should be careful to maintain good relations with its "good" credit customers; and, when taking actions to length the payable deferral period, a firm should be careful not to harm its own credit reputation.

Cash is the most crucial asset in the liquidity portfolio. The gap between cash inflows and cash out flows is bridged through the function of the cash. The receipts and disbursements are balanced by the amount of cash. Therefore, budgeting must be made of expected needs, and action points must be identified for investing surplus balances or securing additional funds to ensure smooth or continuous operations.

Cash is the net outcome of the activities of a business. When a firm functions efficiently, the operating cycle moves smoothly through its cash –to-inventory-to receivables-to cash stages, and final decisions are concerned with the distribution of residual of cash. If this cash cycle is interrupted or if the flow is distorted, financing problem result that may have grave consequences if they are not worked out. **Operating cash flow coverage, rather than asset liquidation value, is the crucial element in liquidity analysis.** It looks at the problem from the perspective of an ongoing entity.

2.1.2 Review of the cash conversion cycle and liquidity ratios

The issue of cash cycle was initially presented by Hager (1976). Rechards and Laughlin (1980) suggested that a simple extension of the operating cycle concept results in the cash conversion cycle. They explained that the cash cycle analysis should be used to supplement the traditional but static liquidity ratio analysis because it provides dynamic insights. They conclude that there is a positive relationship between the current and quick ratios and the cash cycle.

Nodgren (1981) introduced a cash cycle analysis, based on the asset conversion cycle and the liability cycle. Emery (1984) described the characteristics that are required of a good liquidity measure, reviewed and evaluated the conventional ratios with respect to those characteristics. Emery suggested a new liquidity measure, lambda. Lambda is the ratio of cash flow to potential cash flow requirements, indicating the extent to which the firm's resources cover its potential cash obligations. The larger is the value of lambda, the higher is the liquidity of the firm.

Kamath (1989) investigated empirically the hypothesis of conflicting signals between current and quick ratios and cash cycle analysis. He also examined whether the net trade cycle is good approximation of the cash cycle and the relationship between these three liquidity measures and a measure of firm's profitability. Focusing on US large firms in the six retail industries for the period 1970-1984, he found that: current and quick ratios are negatively correlated with the cash conversion cycle, current and quick ratios were not negatively related to the profitability, the net trade cycle provided the same information as the cash cycle and both cycles were found to be negatively correlated with profitability measures. Concluding, Kamath stated that each measure can provide both useful information and misleading clues regarding the firm's liquidity positions, therefore, it is suggested to use all the three measures and get better insights and efficiency of working capital.

Gentry, Vaidyanathan and Lee (1990) developed a weighted cash conversion cycle (WCCC). They defined the WCCC as the measure of the weighted number of days funds

are tied up in receivables, inventories and payables, less the weighted number of day's cash payments are deferred to suppliers. The WCCC focuses on the real resources commitment of working capital, and decomposes inventories into three parts instead of one Rechards and Laughlin (1980) and as other researchers have done before. The result of their work pointed out that the WCCC and the cash cycle are not directly comparable, since the WCCC was highly se4nsitive to the size of payables. They concluded that the WCCC can be considered a more refined to liquidity measure.

Lyroudi and McCarty (1993) examined the empirical relationship of the cash cycle and the current and quick ratios for small US firms, for the period 1984-1988. Their results indicated that the cash cycle was negatively correlated to the current ratio, to the inventory period and the payable period, but positively relate to the quick ratio and the receivable period.

Moss and Stine (1993) examined the relationship between the length of the cash cycle and the size of US retail firms from 1970 to 1990, based on the Standard and Poor's COMPUSTAT data. They also examined the relationship of the cash cycle and other liquidity measures. Their work indicated that that larger retail firms had shorter cash cycles, which implies that smaller firms should try to manage better their cash cycle. The relationship between the cash cycle and the current and quick ratios are found positive and significant, indicating that although strong current and quick ratios are generally desirable, they could imply a large investment in working capital which could lead to problems if not taken into considerations.

Schilling (1997) supports that the cash cycle is a working capital evaluation technique which depicts a firm's average liquidity position during the accounting period. The advantage of this technique is that it can be used to evaluate changes in circulating capital and thereby facilitate the monitoring and controlling of its components.

Gallinger (1997) stands up to scrutiny, and finally suggests dropping these traditional liquidity measurements and selecting the cash conversion cycle as better liquidity measure. He argues that longer operating policies that results in a longer cash cycle produce a larger commitment to cash and non-cash current assets investment and a lesser ability to finance these investments with current liabilities. The implication is that higher

values for the current and quick ratios are usually the result of greater commitment of resources to less liquid forms of working capital.

Brigham and Houston (1998) suggested that cash cycle can be shortened (1) by reducing the inventory period by processing and selling goods more quickly, (2) by reducing the receivable collection period by speeding up collection, or (3) by lengthening the account payable period by slowing down the firm's own payment. *To the extent that these actions can be taken without increasing costs or depressing sales,* they should be carried out.

Gallinger (1997) suggested **that The accounting ratios used to analyze liquidity are current ratio, acid ratio, and net working capital, but these ratios by them self do not give the definition of liquidity even though they show the standard ratio**. The current and quick ratios are functions of many variables that affect liquidity differently.

The important of cash flow gives way to liquidity that accounting ratios are needed to be in question because of their characteristics as mentioned by Metha. Even though they are useful in interpreting performance at the end of accounting period, according to me the defensive interval ratio predicts the time span during which a firm can present liquid assets without resorting to revenues from the next year's income sources. The defensive interval ratio is:

$$\text{defensive interval} = \frac{\text{quick assets}}{\text{daily cash operating expenses}}$$

The statement of cash flows can be applied to calculate cash operating expenses. First, it is necessary to convert accrual sales on the income statements to cash sales[5], and then to subtract from this amount the cash flow from operations and divide the difference by 360 days. The defensive interval does depart from the strictly static analysis of the current and quick ratios and tries to focus attention directly upon the relationship between liquidity and the need for liquidity.

While the quick ratio is a balance sheet/ balance sheet ratio, the defensive interval ratio is the balance sheet/ cash flow ratio. I feel that whenever possible and relevant, the ratios

[5]This is done by adding the decrease in account receivable and subtracting the increase in account receivable for the period to the reported sales amount.

should have such differing bases to increase coverage and to alleviate the definitional dependencies.

Defensive interval ratio can be used to illustrate the fact that the classifications of financial ratios are more or less arbitrary. Depending on the way it is looked at, the defensive interval could as well be deemed a profitability measure. The common way of looking at this ratio is that it indicates how well the liquid assets cover the expenditures needed to keep the operation running. But looking at it the other way round, profitability is dependent on the expenditure incurred. Comparing the operating expenditures to the capital base (liquid assets) that is needed to create the activity, give an inverse type of profitability ratio. Defensive ratio is considered as dynamic ratio because its origin is not from one type of financial statements. As discussed above it includes the balance sheet, income statements, and cash flow.

It is to be expected that when the accounts receivable turnover ratio period gets smaller, the defensive interval ratio grows or the liquidity improves. In this case it could be said that an effective control of accounts receivable improves liquidity.

The following ratio also introduces a dynamic aspect to liquidity which is not normally picked up in static short-term financial ratios. The dynamic aspect involves the speed with which a firm can alter its short-term position to avoid crisis. This is done by considering ratio based on a firm's earnings power, that is, the ratio of:

$$\frac{\textit{Current liabilities} - \textit{Quick assets}}{\textit{Operating funds expected to be generated over a year}} \times 365$$

This ratio gives the number of days required to pay off net current debts, that is, current debt not covered by liquid or quick assets. If this ratio exceeds 365 a firm will be unable to meet its net current obligations out of its current year's expected earnings. If this ratio is significantly below 365 and short-term difficulties arise, the indication may be that additional short-term finance will be obtainable since banks would view such funding as entailing low risk. Expected earnings over the current year are not, however, a substitute for a short-term cash flow forecast which provides better evidence of the ability to repay net current debt.

The time interval between actual cash expenditure for purchase of material resources and the ultimate cash collection from the sale of the products is referred as cash cycle. This integration of cash inflow and outflow patterns provides a fair complete approach to liquidity analysis.

Figure 2.1 shows us that a residual cash flow financing period is influenced by both expansion and contradiction in the three liquidity measures those are inventory period, account receivable period and account payable period. Without lengthening of the account payable period increasing the time of operating period can cause liquidity management problems.

2.1.3 The cash conversion cycle and profitability

The link between the firm's cash cycle and its profitability can be easily seen by recalling that one of the basic determinant of profitability and growth for a firm is its total asset turnover, which is defined as Sale / Total assets. The cash cycle should be inversely related to ROE and sustainable growth, by the fact that the cash cycle is the function of turnover ratio. If the account receivables and inventory turn over ratio increase, as well as follows the decrease of account payables, assuming all other things remaining constant, then the greater is the firm's accounting return on assets (ROA) and return on equity (ROE) as well as sustainable growth. All other things being equal, the shorter the cash cycle is the lower the firm's investment in inventories and receivables. As a result, the firm's total assets are lower, total turnover is higher.

By optimizing the cash cycle, management can improve ROE and sustainable growth. The better the cash cycle, the greater is the availability of debt and equity capital that can be used to service maturing negotiated debt, to invest in new capacity or cost saving equipment.

As far as liquidity is concern managing cash and funds flow have their own importance, because the generation of accounting profit is not guarantee of

corporate solvency. Indeed, profits can generally be improved by adopting some alternative and general accepted accounting principles.

2.2 Economic concept for analysis of liquidity

One of the firm's goals is maximizing profit, while one of the main objectives of liquidity management emphasizes on cash flows. As a result, it should be discussed the differences between profit, accounting profit, economic profit and cash flows.

If nobody does not follow the principle which is known as *on going concern* the presentation of profit would not present difficulties, because the profit could be measured from the beginning of the firm's life to the day the firm goes out of business. In this case all debts would be paid off, and the remaining value over the amount as capital is invested would present as the profit for the period.

The above explanation will remind us that most firms will not start making business with the idea of going out of business at the end of some determined period. Most businesses are motivated with the hope of continued operation or consistency.

Another situation it has to be put in mind is that financial data must be current to be relevance in decision making. Investors or creditors need the financial data to be used should be shorter than the life of the business such as annually, quarterly, monthly, or over some shorter period, depending on the needs of management, creditors, and investors.

Solvency and value depend on cash flow, not on some artificially created accounting profit figure that causes economic profits to lag behind accounting profits. In most business entities, some assets will be used a period greater than the accounting period. The amount of revenues and the amount of costs that can properly assign to the period are a matter of judgement. Much of the technical logic of accounting is associated with rules for assigning revenues and costs to the accounting period.

The generally accepted accounting principles that guide the determination of profit for periods shorter than the life of the business enterprises involves judgement and cannot accomplished with precision and still point toward the basic concept of profit as a *surplus of resources*. Therefore, profit is a residual concept based on the determination of explicit costs to the accountant.

The measuring of a firm's success is not the profit, because it depends on the quality of earning. If credit sale is made, the accounting records will show a profit and the creation of account receivable. So the profit is not recognized in a cash flow sense until the receivable is actually collected. ***Waiting for the collection to be recorded as profit is contrary to matching and realization of the basic rule of accounting.*** So the basis for the difference between profit and cash flow is *the question of timing.*

The management should have to analyze the operation cycle of its firm and its customers who take goods on credit. If this situation could be brought to balance, profit might be the measure of a firm's success.

The idea of cash flow is vitally essential in the management of a business firm. Managers are pertained to allocating resources in such way that are used optimally to maximize the long-term market value of the firm. In the short-term the timing and matching of inflows and out flows of a resources must be balanced so that sufficient liquid resources are to meet the demand by the creditors. In short, managing cash is more important than earning an adequate profit.

Economists and accountants define profits in the similar way, which are a business entity's total revenues minus its total costs. **However, economists' think of profits is determined as the combination of cash flows and opportunity costs.** Economic profits are a cash flow concept. Accountants do not include many of the implicit costs in the total costs incurred by a business entity.

The economist's definition of profit, which is reconcilable to the net present value technique, is defined as being the maximization of residual income[6]. The equality of marginal revenue and marginal cost is equivalent to net present value. The residual

income is logically compatible with a wealth maximization objective. The net present value model is one of the models for calculating investment decisions. The NPV model is as the following:

$$NPV = -I_0 + \sum_{t=1}^{n} F_t \frac{(1-T)}{(1+r)^t} \geq 0, \qquad (2.1)$$

where I_o = incremental investment at time zero,

F_t = incremental pre-tax cash flow from operation occurring in period t,

T = the corporate tax rate,

r = the appropriate risk-adjusted discount rate[7].

As far as the decision is concerned the management should accept when NPV is equal or greater than zero so that this means, in other word, is the marginal revenue must be equal or greater than the marginal cost. The NPV model can be deduced into the residual income model. By taking the assumption that the F_t is constant and n approaches infinity. If this is the case the NPV model can be rewritten as

$$NPV = -I_0 + F\frac{(1-T)}{r}. \qquad (2.2)$$

If both Equations are multiplied by r, residual income, RI, will be as following:

$$RI = r(NPV) = F(1-T) - rI_O. \qquad (2.3)$$

The managers should accept decisions to fulfil the objective of wealth maximization in the investments when the cash flows after tax from the operations $F(1-T)$ exceed or equal to the opportunity costs of investments (rI_0) or when the residual income is not less than zero. Management has to have the knowledge that resources, which are tied up in investment, have an opportunity cost relate with them in order to adjust operating cash flows, because not just those costs that appear in the income statements.

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[6] Ezra Solomon, "The Theory of Financial Management," New York, Columbia University Press, 1963.

[7] The firm's weighted average cost of capital can be used.

To put in practice Equation (2.3), assume that the current asset is $4 000, the fixed asset is $ 8 000, the operating cash flow is $30 000, the corporate tax is 35%, and the opportunity cost of capital is 18%. From the above information, calculate the amount of residual income for the year.

$$
\begin{aligned}
RI &= r(NPV) = F(1-T) - rI_o. \\
&= 30\,000(1-35\%) - 18\% \times 12\,000 \\
&= 19500 - 2160 \\
&= \$17\,340
\end{aligned}
$$

The primary of recording of cash flow is originated from the income statement. The income statement reflects the record of the sale of products or services and their factor costs. Most organizations sell their products on account. As a result, most business entities use an accrual accounting system. Their income statement neither presents economic profit nor contains all the necessary information concerning cash flows. Hence, accrual accounting considers revenues as goods are sold and as services are rendered, independent of the time when cash is received. Expenses are recognized in the period when the related revenue is recognized, independent of the time when cash is paid out.

Since not all sales have been collected the firm has to adjust sales for the changes in the accounts receivables balance. And not all inventories have been sold and purchases have not been paid for, so that it needs to adjust the cost of sales for changes in inventory and account payable balances respectively. Finally, it has to add to net income any non-cash expenses such as depreciation, bad-debt expenses, and deferred taxes. The firm has to follow the above procedure, because it has to convert the accrual accounting based income statement to cash accounting based statement.

In an inflationary environment the historical cost conventions for valuing non-monetary current assets may not show the ability of the firm to raise cash by selling or pledging current assets. Fore instance, if the firm applies LIFO method in inventory evaluation, this method represents the older goods, less inflated on the balance sheet. So the book value of the inventory may be much lower than the amount of money the firm could raise through sale.

Current cost accounting helps that current assets and liability accounts be adjusted to reflect contemporary values so that they hold a closer relationship of the value of cash expenditures. Hence, current cost working capital ratios reflect more information about short-term solvency of the firm[8].

The cost of current asset also provides valuable information about the liquidity value of long-term assets. In spite of the fact that the degree of liquidity of long-term assets typically is less than that of working capital assets, a firm with a cushion of fixed assets is better able to quickly arrange sales, loans, or even leaseback arrangements to meet immediate cash needs.

The basic objective of liquidity manager is to make sure business entity's solvency. The actual and technical solvency provides information about the business entity's solvency. The first one is important in a theoretical sense, while the second one is important in practical wise.

The market value of assets of business entity is greater than its debt in the theoretical wise. Asset values must be sufficient to meet all the obligations when they are due. Of course, the asset values exceed liabilities can be taken in consideration actually only by the sale of the assets. Such an instrument for examine solvency cannot be used by *on going business entity.*

Sustainability of the firm requires well worked out strategic decisions pertaining to investments in both short-term and long-term assets, dividend policy, and the firm's capital structure. Often this objective means that conventional financing sources cannot be relied on.

No other instrument for approximating asset values is fully dependable, and therefore none indicates exactly whether a business entity is *actually solvent.* In practice, the activity is based on the technical solvency or operational solvency.

[8] This kind of adjustment exists theoretically in many countries, because the accounting policies of many countries are different. If adjustment is made practically in many firms for the existing inflation, it may help in assessing their liquidity position before distribution of the earnings. If adjustment is allowed, the income tax size will decrease so the government may loose its income.

A business is known as operational solvent if it pays its debts as they come on due. In this case deciding whether the firm is solvent is easy. Determining whether there are debts, whether they are due, and whether they are fulfilled their obligation can be done readily available facts. Deciding a firm is bankrupt or not is based on the concept of technical solvency.

Inflation and increased economic instability may mean that some financing sources cannot be used at critical times when the firm needs them the most. As a result, managers must be more creative in their financing arrangements without causing perceptible changes in the risk of the firm. **Hence they have used creative asset-based financing and off-balance sheet financing as a means of raising needed capital funds.** These financing alternatives cause assets that are important to the production-sales process, also become as important to the financing and liquidity needs of the business entity.

In order to relate liquidity analysis to the economist maximization model, the manager has to understand the definition and financial effect of the economic concepts for analysis of liquidity and his decisions must be relied also on the following concepts for analysis:

- Economic costs
- Time constraints
    - immediate time
    - short-run time
    - long-run time
- Physical production constraints
- Integration of output and costs
- Incorporating the product market
- Economic concepts and financial statements
    - income statement and economic profit
    - balance sheet and economic stocks and flows
    - economic constraints

The manager who is going to decide has to ask the analysts if the analysis taken by them took in consideration about the difference between the accounting profit and cash flows and how accounting profits differ form economic profits.

Firms are generally involved in a series of decisions, some immediate, others short-term, and still others of a long-term nature. In the immediate time liquidity either exists or does not exist. If it exists, then the firm is solvent; otherwise, it is either technically or actually insolvent. The long-term horizon allows management ample time to structure a liquidity strategy that is consistent with the objective of economic profit maximization. The difficulty in managing and analyzing liquidity falls primarily within the short-term horizon. Cash balances credit decisions, credit policies, investment decisions, including these to pertaining to current assets – all must harmonize in order for the firm to maximize economic profit in the long-term

The manner in which a business entity holds its assets may be more important than a favorable net working capital position, because the ability to pay obligations in cash is the criterion of solvency. Thus net working capital has a little importance to operating efficiency and liquidity management. The fundamental point of concerning liquidity is capability of the business entity to fulfill the obligation in the future, not how much net working capital, profit, or even cash it has at present.

3. Short-term financial planning

The short-term financial planning is referred as working capital planning - the planning of current assets and current liabilities. This topic attempts to investigate the aspects of financial policy, financing of current assets, the trade off between profitability and risk, budget as a means of planning and control, and the percentage of sales as a method of planning. These subtopics have their own importance for the continuous operation of the firm.

Short-term asset policy involves two basic questions: what is the appropriate amount of current assets for the firm to carry, both in total and for each specific account, and how should current assets be financed. Robert (1995) discussed that the current assets are essential to the current operations of a company. In particular, inventory and accounts receivable can have an important impact on company's ability to maintain, and indeed increase, its level of sales. Cash and marketable securities have an important role in relation to liquidity. Brigham, Gapenski, and Ehrhardt (1999) most firms use several types of short term debt to finance their working capital requirements. Short-term debt is an integral part of the balance sheet and in recent years it has found an increased emphasis in enterprises as highly volatile and uncertain interest rate environment has caused a shift into short-term debt.

Robert (1995) suggested that once the investment decision has made, strategies for financing current assets must be addressed. These strategies involve choosing the term structure of liabilities appropriate to a given term structure of assets. The analysis is aided by considering a company's cumulative capital requirement at a given point in time, that is, the total capital necessary to fund a company's total investment. The cumulative capital requirement is determined by fixed or long-term assets; permanent current assets; and spontaneous or fluctuating current assets.

The division of current assets into permanent and spontaneous components arises to the extent that a company can predict its long-term trend in sales. To the extent that it can do this, the proportions of its current assets necessary to support this trend can be considered

to be long-term and, therefore, effectively permanent. The remaining proportions of current asset investment are spontaneous.

Organizations have to be more astute in the handling of their total financing needs. Just as uncertainty in the capital-budgeting problem demands their attention, it is uncertainty that brings cash management to the fore in terms of:

- The timing of Payment and receipts.
- Forecast of the structure of interest rates.
- Forecast of exchange rates.
- Defaults in payments extended and on securities in which funds are invested.
- Use of innovative financial instruments.

If the total requirements exceed the capacity of the enterprise to finance from retained earnings and liquid assets, the cash deficit has to be financed externally- raising a mixture of short- and long-term funds as cheaply as possible. If there is surplus of funds, these have to be invested, either short term or long-term, so as to make the best use of them.

The focus is the financial planning of the enterprise. It should be assumed that the objectives of the enterprise have been established, and that:

- The production plans.
- The investment plans.
- The marketing plans of the enterprise have been determined in the light of these objectives.

The ability of the firm to match the growth in demand for its products to the growth in production capacity will permit a balance in the growth of the firm. This can then be taken as given for *the financial planning process*. Of course, this presumes a sequential treatment of first investment plans and financing. In practice it is unlikely that investment decisions would be taken independently of financing decisions. The actual and forecast sales are reference point, but it is the collection of account receivable that

creates the operation cash flows. As input costs, these will involve payments some of which are fixed, others variable.

3.1 Aspect of short-term financial policy

The working capital management has its own policy that considers both a firms' level of working capital investment and its financing. In practice, the firm has to determine the joint impact of these two decisions upon its profitability and risk. In other words, Robert (1995) explained that the benefit of liquidity, in terms producing low risk but low returns, should be waited against relatively higher returns but higher risks produced by investing in long-term physical or fixed assets.

The short-term financial policy that a firm adopts will be reflected in at least these ways:

- The size of the firm's investment in current assets.
- The financing of current assets.

After putting these two areas together, it can be observed that firms with flexible policy would have a ***relatively large investment with relatively less in short-term debt.*** The next effect of a flexible policy is thus a relatively high level of net working capital. This effect results that the firm maintains a larger overall level of liquidity.

The size and nature of a firm's investment in current assets is a function of a number of different factors, including the followings:

- The type of product manufactured,
- The length of the operating cycle,
- The sales level,
- Inventory policies,
- Credit policies, and
- How efficiently the firm manages its current assets.

When the firm follows flexible policies with regard to current assets, the size of the firm's investment in current assets will increase because of the followings:

- Keeping large balances of cash and marketable securities
- Making large investment in inventory
- Granting liberal credit terms, which result in high level of accounts receivables

When the firm applies aggressive short-term financial policies with regard to current assets the size of the firm's investment in current assets would decrease because decisions are restrictive and action will be just the opposite of flexibility policies.

Ross, Westerfield and Jordan (1998) determining the optimal level of investment in short-term assets requires an identification of the different costs of alternative short-term financing policies. The objective is to trade off the cost of an aggressive policy against the cost of flexible one to arrive at the best compromise.

The flexible short-term financial policies are costly in that they require a greater investment in current assets. This in turn results higher holding costs and lower with aggressive policy. ***However, the firms expect that future cash inflows will be higher with a flexible policy.***

An aggressive short-term financial policy could decrease the ***future sales because holding of cash, market securities, inventories, and receivables are minimized.*** In this policy, current asset are turned over more frequently. Under flexible policy, sales are stimulated by the use of a credit policy that provides liberal financing to customers and a corresponding high level of receivables. Under this policy, it is also possible ***that higher prices can be charged to customers.*** Customers may be willing to pay higher prices for quick delivery service and more liberal credit terms implicit in flexible policies.

The increase in the firm's sales and cash flow can be estimated for each additional amount of money invested in current assets. The NPV model can be applied to determine the optimal investment in current assets – that is, the investment in current assets should be increased as long as the NPV of additional invested amount of money in

current assets is positive[9]. The optimal level of current assets is the level that minimizes the firm's cost. By focusing on costs, the firm can better manage its holdings of current asset.

Managing current assets can **be thought of as involving a trade-off between carrying costs and shortage costs[10].** When a firm makes larger investment in its current assets its carrying costs will be higher. The trade-off between carrying costs and shortage costs can be reduced from Figure 2.1. When a firm applies flexible policy carrying costs increase with the level of investment in current assets. As a result, the total cost shifts to the right of the minimum point when the investment in current assets increases and the shortage costs decrease with increases in the level of investment in current assets.

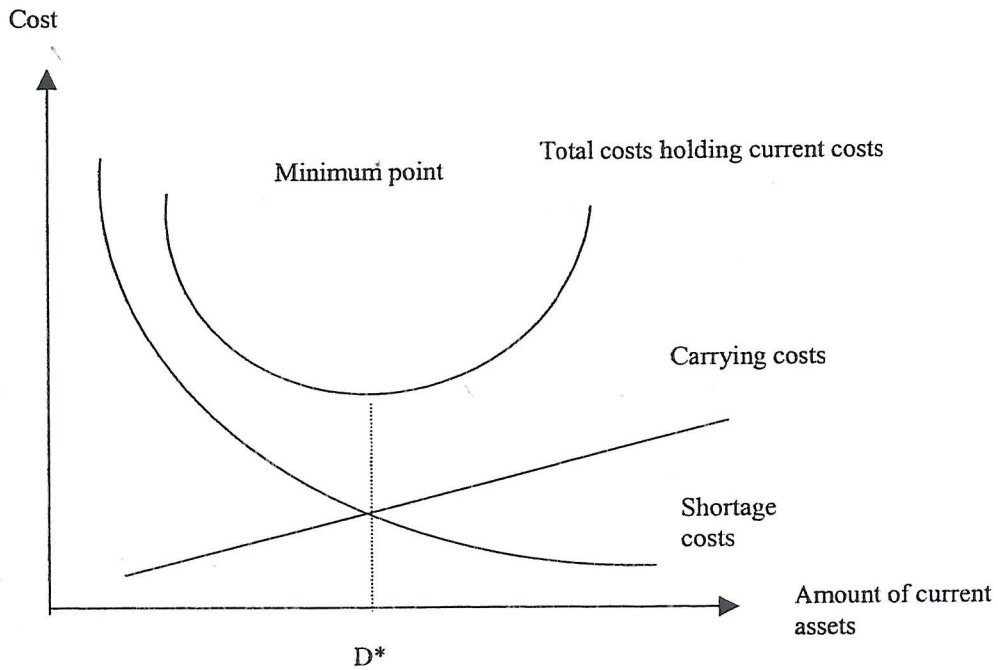


Figure 3.1
Carrying costs and shortage costs[11]

[9] The NPV model is briefly discussed under some problems of trade credit

[10] The trade of carrying costs and shortage costs of current assets can be reduced as the managing of receivables.

[11] It is adapted from the Wilson model

When a firm uses restrictive policy its level of investments in current assets decreases. The total cost shifts to the left of the minimum point, the carrying costs decrease, and the shortage cost increases. **Of course, if a firm runs out of cash and cannot readily sell marketable securities, it may have to borrow or default on its obligations.** A firm may lose customers if it runs out of inventory (a stock-out) or if it cannot extend credit to customers. More generally, there are two kinds of shortage costs:

- Trading, or order costs,
- Costs related to lack of safety reserves.

Optimal current asset holdings will be highest under flexible policy. This policy is one in which the carrying costs are perceived to be low relatively to shortage costs. Under aggressive current assets policies carrying costs are perceived to be high relative to shortage costs, resulting in lower current asset holdings.

The job of financial manager is to strike a balance between the costs and the benefits of current assets, that is, to find the level of current assets that minimizes the sum of carrying costs and shortage costs.

3.2 Financing current assets

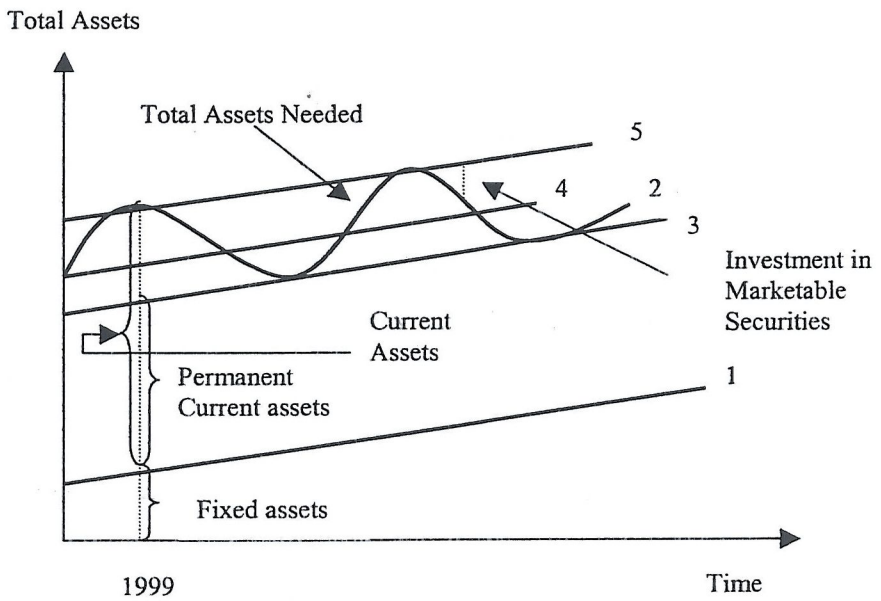
The firm once decides the level of current assets it will hold, and the decision it makes on how to finance those current assets determines its net working capital. The firm has to decide how to finance its current assets. **Zero networking capital or positive net working capital approach should be the financing method of current assets.** If this is the case the firm must consider two main factors when deciding how to finance current assets.

- Maturity matching.
- Financing costs.

Figure 2.2 illustrates the variability of a firm's total assets over time for various financing policies. First, note that because the firms tend to grow over time, fixed assets also generally grow over time, as indicated by the general upward slope of Curve 1. The total assets needed for the firm's operations are described by Curve 2, which indicates seasonality in the firm's total asset. If the firm needs very substantial inventory in the period leading up to peak selling period and the firm may borrow money to invest inventory before the peak-selling season. Both inventory and borrowing level will decrease after the peak selling period. The difference between curve 2 and curve 1 represents the firm's current assets needed.

Figure 3.2

Variability in Fixed and Total Assets over Time[12]



Should the firm finance by short-term borrowing? Should the firm finance by long-term borrowing and equity or by a bit of both its assets? Curve 3, 4, and 5 (optimal financing) in Figure 3.2 represents three possible financing strategies. In each policy, the firm finances all assets below the respective curves by long-term liabilities and equity.

[12] It is developed form managerial finance.

The differences among the three financing strategies relate to how a firm finances the seasonal current assets. Curve 3 (fixed assets and permanent assets financed by long-term liabilities and equity; seasonal current assets financed by short-term borrowing and payables) represents the policy the best fits the maturity matching principle. In accord with maturity matching principle, a firm should finance all assets below the curve (fixed assets + permanent current assets, where permanent asset is lower level of current assets needed at each time) by long term liabilities and equity. A firm should finance all current assets above Curve 3 by short-term liabilities. In this way the firm achieves the maturity principle.

If long-term liabilities and equity are substantial cheaper than short-term liabilities, it may pay a firm to violate the matching principle. The firm may decide to finance all its assets by long-term borrowing and equity. Curve 4 demonstrates this asset financing strategy. In such a case the firm will have extra cash whenever its current asset needs decrease due to seasonality, and the firm will convert the extra cash into short-term, market securities. The volume of investment in marketable securities is shown by the difference between Curve 4 (all assets, which are fixed assets and both permanent and seasonal current assets, financed by long-term borrowing and equity) and Curve 2 (total assets), which varies over time. Whenever the firm needs to purchase inventory or other current assets, it will simply sell some of its marketable securities. However, this policy has a drawback. The firm may lose money because long-term debt is generally more expensive than short-term debt. Thus, the firm may forego interest – the gap between the marketable securities' and long-term debts' interest rate. However, the advantage of the policy represented by Curve 4 is that the firm does not need to continually credit contract for borrowing – a practice that may lead the firm to financial distress if short-term interest rates rise to unexpectedly high levels. Thus, curve 4 represents a lower risk, but probably the most expensive, financing policy.

The cost and risk of each financing policy can be elaborated by comparing Curve 3 and 4, which illustrate the risk-return relationship. As describe above, short-term interest rate are generally lower than long-term interest rates, so the financing policy described by Curve 3 is less expensive than the one described by Curve 4 but, at the same time, riskier. The firm pays the lower short-term interest rate. However, it is exposed to risk that when it needs more funds, it will have to borrow at a higher interest rate if that rate on borrowing

has increased. On the other hand, the financing policy expressed by Curve 4 is less risky but more expensive. Although the firm would not have to worry about the availability of short-term borrowing or its rate at renewal, the cost of long-term debt would probably be greater than the interest rate the firm could earn on its investment in marketable securities.

The sources of short-term financing could be the accruals, account payable, short-term bank loans, line of credit, revolving agreement and secured loan agreement to cover a temporary cash deficit.

Finally, it is interesting to note that financing policies corresponding to Curves 3, 4, and 5 all advocates financing at least the permanent portion of current assets with long-term debt and equity. This implies the current assets are larger than current liabilities; hence the net working capital is positive.

3.3 The trade off between profitability and risk

A trade off exists between a firm's profitability and its risk. Profitability is measured by the rate of return on total assets that is EBIT/total assets. A firm that cannot pay its bills as they come due is said to be *technically insolvent*. It is generally assumed that the greater the firm's net working capital, the lower its risk. As the result, the focus will be the tradeoff when current assets and current liabilities change separately.

The effects of changing the level of the firm's current assets on its profitability as well as risk trade off can be illustrated by taking into consideration the ratio of current assets to total assets. The effects of an increase in this ratio will lead to decreasing of profitability and decreasing of risk when the level of total assets assumed to remain unchanged. **When current assets increase profitability decreases, because current assets are less profitable than fixed assets**. Fixed assets add more value to the product than that provided by current assets. As the ratio of current assets to total assets increases the risk effect decreases. The increasing in the ratio also results increasing on

net working capital, which reduces technical insolvency. If the firm's current asset to total asset ratio decreases, then the firm's profit and risk will increase.

The effects of changing the level of the firm's current liabilities on its profitability and risk trade off is simple to follow the same procedure like the effect of changing the level of current assets, but the ratio will be current liabilities to total assets. This ratio shows the percentage of total assets that has been financed with the current liabilities. The total assets assumed to remain unchanged here too. When the ratio increases, profitability increases, because the firm uses more of the less expensive current liability financing and less long-term financing. Current liabilities are less expensive because only notes payable have cost. When the ratio increases, the risk of technical insolvency also increases, because net working capital decreases as the current liability increases. If current liabilities increase the effect on profitability will be the opposite.

3.4 Budget as means for planning and control

The tangible product of the planning process is the financial plan describes the firm's financial strategy and projecting its future consequences by means of budgeted financial statement and cash budgets. The plan establishes financial goals and is a benchmark for evaluating subsequent performance.

Financial planning is composed of three major activities of a firm: its investment, financing, and dividend policies. During periods of economic uncertainty and/or high inflation, financial planning is important for three majors: increased investment risk, increased cost of equity and debt financing, and an increased shareholder preference for current rather future income.

Financial planning process consists of analyzing the investment and financing choices open to the firm; projecting the future consequences of current decisions; deciding which alternatives to undertake and measuring subsequent performance

against the goals set forth in the financial plan. Budgeting is also an important part of the entire planning process of an organization.

From a planning perspective, a budget is the glue that makes the different parts of the firm fit together. It harmonizes the firm's strategy with its organizational structure, its management and its personnel, and the tasks that need to be done to implement strategy. When well done, it translates the strategic plans of the firm and its implementation programs into period-oriented operational guides to firm activities.

One of the first issues to be settled is the extent to which budget formulation involves all management levels. Both the top-down and bottom-up[13] approaches have advantages whose importance varies in accordance with the nature of the business and the firm's stage of development.

The bottom-up approach makes use of operating management's detailed knowledge of the environment and the market place, knowledge that is available only to those who are involved on a daily basis. The more responsibility unit managers have for innovation, the more their inputs are needed in budget formulation, for they are best able to decide courses of action and targets for their units. They know what must be done, where the opportunities lie, what weakness need to be addressed, where resources should be allocated.

A well-prepared budget can be an effective device to communicate objectives, constraints, and expectation to personnel throughout an organization. Such communication promotes the understanding of specifically what is to be accomplished and how. Participation in the budgeting process helps produce a spirit of cooperation, motivation employees, and instilling a feeling of teamwork. Employee participation is also needed to obtain necessary information from various sources. Without an integration of information, it is impossible to plan effectively.

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[13] The bottom-up approach incorporates the operational plans, information on competition, production, and markets where as the top-down approach incorporates economic and industry projections, firm planning parameters, corporate goals and over all resource availability. So for companies requiring quick responses to competitive pressure, top-down budgeting can be disastrous.

The strategic and tactical planning requires information regarding the economy, environment, technology developments, and available resources are incorporated into the setting of goals and objectives. These planning processes also demand that as activity takes place and plans are implemented, monitoring system will be in place to provide feed back so that the control function can be put into operation.

Managers engaging in strategic planning should identify key variables (internal and external) once corporate goals are specified.

After key variables have been identified, information related to them can be gathered. Much of this information will be historical and qualitative and will provide a useful starting point for planning activities. Assumptions are then made about the changes that may occur in the key variables during the planning period.

Planning must go beyond qualitative narratives of goals, objectives, and means of accomplishment. Limiting planning to qualitative narratives also limits the comparison so actual results with expectations to generalizations. Therefore, management should translate qualitative narratives into quantitative format. **A budget is the quantitative expression of an organization's commitment to planned activities and resources acquisition and use**. In preparing the budget, care should be taken to include information from persons who must work under the budget guidelines. Employee participation is essential if the budgeting process is to be effective.

The master budget is the comprehensive set of all budgetary schedules and the pro forma financial statements of an organization. A financial budget aggregates monetary details from the operating budgets. This monetary information reflects the funds to be generated or consumed during the budget period. Financial budget includes the cash and capital budgets of the firm as well as the firm's projected or pro forma financial statements.

Firms must plan for both the short-term and long-term. Short-term planning rarely looks ahead further than the next 12 months. It is largely the process of making sure the firm has enough cash to pay its bills and that the short-term borrowing and lending are arranged to the best advantage.

Financial planning (cash and profit) is an important aspect of the firm's operations, because it provides roads for guiding, coordinating, and controlling the firm's actions to achieve its objectives.

The major components of the master budget are shown using diagram as followings:

Figure 3.3

An Overview of Master Budget[14]

[14] The master budget is developed from Managerial Accounting: Concepts for Planning, Control, Decision making

Figure 3.3 presents an overview of the sequence of preparation and component budgets of the master budget, indicates which departments are responsible for which budget's preparation, and illustrates how the budgets interact with one another.

Short-term financial planning begins with the sales budget. A sales budget is a detailed schedule showing the expected sales for coming periods. Much time and effort should be put into preparing an accurate sales budget, since it is the key to the entire budgeting process.

After the sales has been set, a decision can be made on the level of production that will be needed for the period to support sales, and the production budget can be set as well. Production plans are developed that take into account lead (preparation) time and include estimates of the required type and quantities of raw material. Using production plans, the firm can estimate direct labor requirements, factory overhead outlays, and operating expenses. These budgets, in turn, are needed to assist in formulating a cash budget for the period and the budgeted financial statement.

Once the different type of budgets is developed, it will be simple to work out with the projected manufacturing income statement, balance sheet and budgeted statement of cash flows. The preparation of these statements requires a careful blending of a number of procedures to account for the revenues, costs, expenses, assets, liabilities and equity resulting from the firm's anticipated level of operations. The financial manager frequently uses one of a number of simplified approaches to estimate the pro forma statements. The most popular approaches are based on the belief that the financial relationships reflected in the firm's past financial statements will not change in the coming period.

Even though I attempt to show how should be prepared the master budget by different departments, but the concern is the cash budget. The cash budget needs the participation of various levels of management to achieve the objective of the organization. It has to be noted that "the appropriate budgetary system and its implementation techniques are dependent upon organizational structure, management strategies, corporate goals and objectives, leadership style of top management, and employee attitudes and so on."

Perhaps the most critical ingredient to proper management is the ability to estimate the cash flows so the firm can make plans to borrow when cash is deficient or to invest when cash is in excess of what is needed. The firm estimates its general needs for cash as a part of its overall budgeting or forecasting, process. First, it plans its operating activities such as expenses and revenues for the period in question. Then, the financing and investment activities necessary to attain that level of operations must be forecasted. Such forecasted entail the construction of pro forma balance sheet, income statement and statement of cash flows are combined with projections about the delay in accounts receivable, the delay in paying suppliers and employees, tax payments dates, dividend and interest payments dates, and so on. All this information must be summarized in the cash budget, which shows the firm's projected cash inflows and outflows over some specified period. The cash budget provides much more detailed information concerning a firm's future cash flows than do the budgeted income statements and balance sheets. Observe form Figure 3.3 that all of the operating budgets, including the sales budget, have an impact of some type on the cash budget. In the case of the sales budget, the impact comes from the planned cash receipts to be received on sales. In the case of other budgets, the impact comes from the planned cash expenditures within the budgets themselves.

Most operating budgets are based on the passage of time, with revenues and expenses related to calendar periods. In the uncertain atmosphere of start-up companies, the budget might better be related to important actions or events because the firm often takes longer than anticipated to get products perfected, to land the first big order, or to get financing in place. In other than start–up situations, budgets are related to time periods in the followings.

In Figure 3.3, it can be observed the capital budgeting is involved. To make wise investment decisions, mangers need tools that will guide them in comparing the relative advantages and disadvantages of various investment alternatives. I do not focus on those tools, because if some one is interested he can refer to Bélyász (2001) as they are discussed briefly, but I would like to put some words about capital budget in general.

The term capital budgeting is used to describe actions relating to the planning and financing of capital outlays for such purposes as the purchase of new equipment, the

introduction of new product lines, and the modernization of plant facilities. As such, capital budgeting decisions are a key factor in the long-run profitability of a firm. This is particularly true in situations where a firm has only limited investment funds available but has almost unlimited investment opportunities to choose from. The long-run profitability of the firm will depend on the skill of the mangers in choosing those uses for limited funds that will provide the greatest return. The selection process is complicated by the fact that most investment opportunities are long-term in nature, and the future is often distant and hard to predict.

The sales budget is prepared from the sales forecast. Factors that are considered in making sales forecast include the followings:

- Past experience in terms of sales volume.
- Prospective pricing policy.
- Unfilled order backlogs.
- Market research studies.
- General economic conditions.
- Industry economic conditions.
- Movement of economic indicators such as gross national product, employment, prices, and personal income.
- Advertising and product promotions.
- Industry competitions.
- Market share.

Sales from prior years are used as a starting point in preparing a sales forecast. Forecasters examine sales data in relation to various factors, including prices, competitive conditions, availability of supplies, and general economic conditions. Projections are then made into the future, based on those factors that the forecasters feel will be significant over the budget period. In-depth discussions generally characterize the gathering and interpretation of all data going into the sales forecast. These discussions, held at all levels of the organization, develop perspectives and assist in assessing the significance and the usefulness of data.

Garrison and Noreen (1994) presented that statistical tools such as regression analysis, trend and cycle projection, and correlation analysis are used in sales forecasting. In addition, some firms have found it useful to build econometric models of their industry or of the nation to assist in forecasting problems. Such models hold great promise for improving the over all quality of the budget data.

There is no one best budget period or interval – the period should fit the needs of a firm, in terms of its planning horizon, the difficulties of budget preparation, and the link of the budget to strategic planning. Participating budget takes longer than top-down budget.
The budget and the strategic plan should be prepared during the same time period in order the links between them to be close. Usually, however, the strategic plan precedes the budget and the linkage is less pronounced.

Large corporations with sophisticated formal planning systems use budgets extensively for control – first for coordinating dispersed business units and later, for evaluating units' performances.

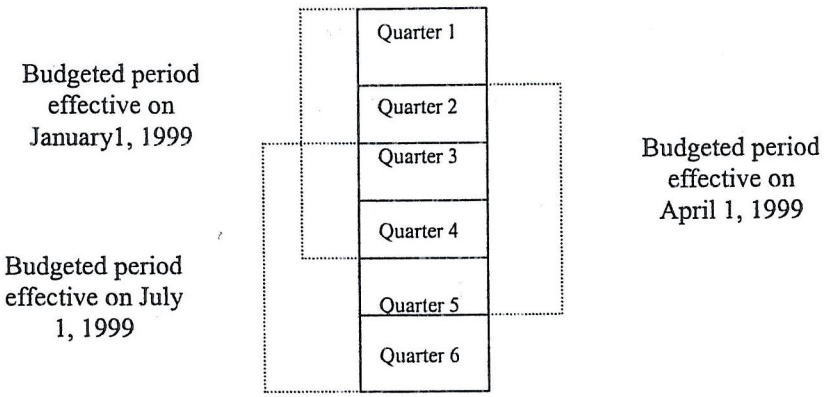
Firms can choose to budget for the year ahead or opt for a "rolling budget" always looking ahead 9 months to 12 months. The rolling budget system involves budgeting an additional quarter at the end of each quarter, and then adding this on to the existing budget.

As shown in Figure 3.4 on April1, 1999 a three month period, "Quarter 5" is added to the 1999 calendar year budget to it to April1, 2000. Another quarter is added on June30, 1999. In this way, management always has a twelve-month budget at the beginning of each quarter. When a firm could have a rolling budget without revising its fixed-period budget most firms that use rolling budgets revise their budget at least once during the year as they roll forward.

Budget revision, however, is highly controversial issue. Should a firm revise its annual budget during the course of the fiscal year as condition change? Revised budgets are more accurate, since they embody the best knowledge available, revision makes a budget a rubber yardstick that cannot accurately measure performance or evaluate management.

Figure 3.4

Rolling budget



Large firms use budgets for annual planning and then for control to ensure that operations go according to the original plan. On the other hand, a trade off exists between continually revised budgets that permit innovation but are not ensuring efficient operations, and rigid budgets that exert tight controls over operations but hamper innovations.

Successful management through delegation requires a clear set of objectives for individuals responsible for the various tasks in organization. These objectives can be production standards, sales quotas, budgets containing estimates of the level of production and the cost and revenues involved – all variables. Periodically, results are compared against estimates to determine if corrective actions or revised plans needed.

When fast changing markets force small firms into such uncertainty that they seldom achieve even the most precisely calculated sales and production forecasts, a flexible budget is a powerful tool for analyzing performance. This can separate the effects of variation between actual and estimated costs, between actual and estimated revenues, and so on. For firms in uncertain environments, particularly those in manufacturing or distribution, the flexible budget is one of the most important control tools available.

A flexible budget would substitute results in terms of units or services produced or sold for estimates, use estimating costs and prices. Thus providing a standard of comparison

and compare results with estimates on a "flexible" basis is isolating variances in terms of changes in costs, revenues, price levels, and use of resources.

Clearly, cash budgets will be prepared on a one-year basis for annual budgeting and then for periods up to five or ten years for long-term planning. The end objective is the same- to get a picture of what firm's cash balance position will be regarding the availability of funds or the financing will be required.

In addition to requiring long-term plans, the firm needs to take into account the variability that is likely to be experienced in the cash flows actually realized. **In the financial planning process section the elements and segments of cash budget are put on the bases of sales forecast. Sales are obviously subject to variation.** Provision must be made for altering the cash budget based on different possible levels of sales. In addition to variability in sales, other receipts and disbursements are subject to error as well. Expenses and other disbursements may differ because of the performance of controlling material, labor and other costs.

Variability can be experienced in all elements of cash budget. This has given rise to sophisticated computer techniques for analyzing the cash budget as well as other elements of financial planning. No matter how complex the computerized approaches to cash planning and other aspects of financial planning employed, the underline logic must follow the principles set forth in the financial planning process discussion. If these are understood, they can readily be applied in any sophisticated type of computerized handling of mechanics of the financial planning process.

In the previous discussion it was said that the cash budgets might have to be extended over a long number of years into the future to relate to other long-term plans. In addition, in some business firms in highly volatile types of business activities, cash budget may be required for time intervals or less than one month. It is not uncommon for firms engaged in daily cash forecasting.

It should be emphasized that the cash budget, like other elements of the firm's financial planning, does not represent an end in itself. It provides a tool for the more effective

management of the firm.[15] The effects of an increase or decrease in sales, a change in the average collection period, a change in labor costs, and so on, can all be analyzed and their effects on the firm's future cash flow position can be estimated.

The purpose of such practice is to provide the firm with an early lead-time for adjusting to changes that may take place in its future. The emphasis should be on considering how the firm might best adjust to possible future changes. Also, the value of cash budgets and other financial planning tools is to enable the firm to determine which changes have major effects and which have only minor effects.

However, the main emphasis is on how the firm might adjust to deal with future contingencies. If sales fall off, can expenses be quickly adjusted downward? If sales increase, can additional purchases be made and will additional labor be available? At what level of increase in sales will additional machinery and equipment be required? What will be the effect of a change in sales or changes in materials and labor costs on the firm's profitability and on cash flows? Does the firm have any maneuverability in adjusting to such changes? Financial plans are tools to guide the firm in formulating sound policies and in making rapid adjustments to changes in the economic environment and to competitive changes that are always taking place.

Carruth, McClendon and Ballard (1983) suggested that in administering the budget program, it is particularly important that top management not use the budget as a "club" to pressure employees or as a way to find someone to "blame" for a particular problem. This type of negative emphasis will simply breed hostility, tension, and mistrust rather than greater cooperation and productivity. Unfortunately, their research suggests that the budget is often used as a pressure device and that great emphasis is placed on "meeting the budget" under all circumstances.

Rather than being used as a pressure device, the budget should be used as a positive instrument to assist in establishing goals, in measuring operating results, and insolating areas that are in need of extra effort or attention. Any misgivings that employees have about a budget program can overcome by meaningful involvement at all levels and by

[15] With modern computer techniques, it is possible to reflect the effects on future cash flows of a large number of alternative possibilities that the may occur.

proper use of the program over a period of time. Administration of a budget program requires a great deal of insight and sensitivity on the part of management. The ultimate objective must be to develop the realization that the budget is designed to a positive aid in achieving both individual and the company goals.

3.5 Percentage of sales as forecasting method

It allows a firm to estimate the amount of additional financing it will require in an upcoming period. The proportions of short-term and long-term debt that make up the additional requirements can be determined by analyzing the profitability-risk trade-off of alternative working capital investment and financing policies. This situation is discussed under financing current assets.

Most of the business entities use percentage of sales method for forecasting. This method assumes that

- present asset levels are optimal with respect to present sales;
- most items on the balance sheet increase in proportion to sales increases; and
- the firm's profit margin on sales (PAT/sales) remains constant.

As it has been discussed that the most important variable that influences a firm's financial requirement is its forecasted monetary value of sales. As a result, a good sales forecast is a vital foundation for forecasting financial requirements.

The balance sheet and the income statement are given for the given firm; the question is what percentage increase or decrease the existing amount of sales. In this case, the firm needs to increase its sales; as a result, the firm should isolate those balance sheet items that can be expected to vary directly with sales, because not all items of balance sheet may change with the change of sales. It is clear that more cash, more account receivables, more inventory, additional productive capacity, more long and short account payable, and accrued payable are required, When the sales level is increased from the origin.

As the firm's sales increase $E(S)$, its assets (A) will increase proportionately to support the new sales. In addition, the current liabilities, (L) that vary directly with sales, namely account payable, will also increase. It is assumed too that dividend (d) is paid out and the retained earnings (m) is subtracted. This relationship can be expressed in equation form as follows:

$$\text{External funds required} = \frac{\text{A}}{\text{S}}(\Delta S) - \frac{L}{S}(\Delta S) - \text{E}(S)bm \qquad (3.1)$$

Fore instance, if the existing sales amount is \$500 million and the forecasting is \$900 million, or increase by \$400 million. The assets that will increase spontaneously with sales as a percentage of sales is 75 %, the liabilities that increase spontaneously with sales as a percentage of sales is 20%, the profit margin is 6% and the retained earnings ratio is 7%.

External funds required = 0.75(400) –0.2(400) –0.07(900) 0.06
= 0.55(400) - 0.0042(900)
= \$ 216.22 million

A portion of the financing required can be generated internally from increased retained earnings. Specifically, the increased retained earnings generated during the time period when sales increase from S to $S + \Delta S$.

When the increase of sales is smaller, it may result negative external funds. If the amount of external fund required is negative, the business does not need external funds. In fact, the firm has excess of its requirement. It should plan to increase dividends, repay debts or look for additional investment opportunities.

If the increase of sale's percentage is larger, then external funds required will be higher. Higher increase causes the business to enter into the market for outside capital. In different way, a certain level of growth can be financed from internal sources, but higher level of sales growth need external financing. Recall that the difference between

increased sale *E(S)* and the sale (S) is the increase in sale (ΔS) and this can be rewritten when g is growth:

$\Delta S = (1 + g)S - S = S(1 + g - 1) = gS$

Let's deal with the expression for external funds needed. Equation 1.6 will help us to drive the percentage increase in sales that will have to be financed externally (PEFR) as the function of the critical variable involved. In Equation 1.6, let A/S – L/S = P, and substitute for ΔS and *E(S)*, divide both sides by $\Delta S = gS$.

$$PEFR = P - m/g(1 + g)b$$

The above equation helps us to investigate the influences of economic factors such as increased rate of inflation on the percentage sales growth required to be financed externally.

The approximate amount of additional financing required for the given firm is $ 216.22 million. Even though the financing will be needed gradually as sales increase, the firm has to decide whether to

- borrow on a short-term basis,
- borrow on long-term basis,
- sell additional common stock, or
- cut dividends.

The factors that influence the short-term versus long-term debt decisions have been discussed under the topic 3.2, but those decisions may change depending on the different characters and positions of the given firm.

The percentage of sales method is most appropriately used that for forecasting relatively short-term changes in financing needs. It is less useful for longer term forecasting for the reasons that are best described in connection with financial analysis and planning discussed in the next section specially the dynamic method.

4. Financial analysis and planning

The regression and linear algebra techniques are used to show how accounting information can be used to perform active financial analysis. These methods can be applied not only in current assets but also in long-term financial asset as well as to determine the weights of portfolio. So these interesting works provide better information for the managers in decision-making.

Accounting information, market information and basic aggregated economic data are the basic data in puts for the conduct of financial analysis and planning: statistical methods, regression analysis, operations research programming techniques and computer programming knowledge are important tools for achieving financial planning and forecasting. In performing financial analysis and planning, it is important to know how to use appropriate tools in analyzing the useful data.

The traditionally stated major purpose of using financial data in the ratio form is making the results comparable across firms and over time by controlling for size. This basic assertion gives rise to one of the fundamental trends in financial ratio analysis. The usually stated requirement in controlling for size is that the numerator and the denominator of a financial ratio are proportional.

Technically, financial ratios can be divided into several, sometimes overlapping categories. A financial ratio is of the form X/Y, where X and Y are figures derived from the financial statements or other sources of financial information. One way of categorizing the ratios is on the basis where X and Y come from (see Foster, 1978, pp. 36-37, and Salmi, Virtanen and Yli-Olli, 1990, pp. 10-11). In traditional financial ratio analysis both the X and the Y are based on financial statements. If both or one of them comes from the income statement the ratio can be called dynamic while if both come from the balance sheet it can be called static (see ibid.). The concept of financial ratios can be extended by using other than financial statement information as X or Y in the X/Y

ratio. For example, financial statement items and market based figures can be combined to constitute the ratio.

In this topic it is review the existing trends in financial statement analysis literature by focusing primarily on the theoretical and empirical basis of financial ratio analysis. This is an important task to carry out since the ratios are often used intuitively, without sufficient consideration to their theoretical meaning and statistical properties. In doing this it is my purpose to pinpoint the different directions taken in quantitative ratio based research. By critically considering financial ratio literature, it is also aim to help the decision makers to use ratios in an efficient way.

The seminal paper is this field is Lev and Sunder (1979). They point out, using theoretical deduction, that in order to control for the size effect, the financial ratios must fulfill very restrictive proportionality assumptions (about the error term, existence of the intercept, linearity, and dependence on other variables in the basic financial variables relationship models $Y = b\,X + e$ and its ratio format $Y/X = b + e/X$). It is shown that the choice of the size deflator (the ratio denominator) is a critical issue. Furthermore, Lev and Sunder bring up the problems caused in multiple regression models where the explaining variables are ratios with the same denominator. This is a fact that has been discussed earlier in statistics oriented literature like in Kuh and Meyer (1955).

Two interrelated trends are evident. Theoretical discussions about the ratio format in financial ratio analysis and empirical testing of the ratio model. While mostly tackling the former Whittington (1980) independently presents illustrative results finding the ratio specification inappropriate in a sample of U.K. firms. Whittington also discusses the usage of a quadratic form in financial ratios analysis. Significant instability in the results was reported.

In the discussion on Barnes's paper (Horrigan, 1983, Barnes, 1983), Horrigan puts forward that financial ratio research should be more interested in the role of the financial ratios themselves than in "the nature of the ratios' components or to the ratios' incidental role as data size deflators".

To extrapolate from Horrigan's critique, in my own interpretation the validity of financial ratio analysis should be determined by its usefulness to the decision making process of the different interested parties (owners, management, personnel,...). To illustrate, consider the potential impact of economics of scale. To assess the efficiency of management a direct comparison of financial ratios of small and big firms would have to be adjusted for the size effect. On the other hand, an investor evaluating different investment targets might be more interested in the level of profitability regardless whether or not it is a result of the size effect.

McDonald and Morris (1984, 1985) present the first extensive empirical studies of the statistical validity of the financial ratio method. The authors use three models with two samples, one with a single industry the other with one randomly selected firm from each (four-digit SIC) industry branch to investigate the implications of homogeneity on proportionality. The first model is the traditional model for replacement of financial ratios by biviriate regression with intercept $Y(i) = a + b\,X(i) + e(i)$.

The above model is central in this area. It is characteristic that the testing for proportionality is considered in terms of testing the hypothesis H0: $a = 0$. Barnes (1986) points out for statistical testing that the residual is typically heteroscedastic. For a discussion also see Garcia-Ayuso (1994). The second model in McDonald and Morris is $Y(i) = b'X + e'(i)$ that is without the intercept to tackle heteroscedasticity. Dropping the intercept from the model is not always enough to treat the heteroscedasticity (see Berry and Nix, 1991). The third model applies a (Box-Cox) transformation on the first model to tackle non-linearities. While they find support for financial ratio analysis for comparisons within industry branches, in inter-industry comparisons proportionality of financial ratios is not supported.

4.1 Critique of accounting information

Accounting information seems to be heavily audited and regulated, automatically determining what numbers are presented. However, careful analysis makes it apparent

that accountant works within a fairly broad framework of rules that increase the distance between accounting and financial valuation. This Leeway in accounting rules also tends to make accounting information more random. In addition Hong (1977) shows that the selection of LIFO and FIFO methods for tax and depreciation based upon historic cost generally introduce a bias in a firm's market value determination. This combination of discrepancy, bias, and randomness means that accounting information doesn't present the "true" information. As a result, both time series and cross-sectional comparison of accounting information are difficult to analyze.

A major problem with the use of accounting information arises from errors made in classifying transactions into individual accounts.

The difference between accountancy and finance theory is another case of classification error. An accountant defines income as the change in shareholder's wealth due to the operations of the firm. This includes the use of accruals in wealth determination. The finance discipline defines a firm's income as cash income, or the difference between cash revenues and cash expense. Due to the accruals used in accounting, accounting income is numerically different form cash income because of a difference in timing.

Another problem with accounting information relates to depreciation costs. There are various accepted methods to spread the cost of an asset over its useful life. The choice of depreciation method can cause a wide variation in net income. A straight-line method will reduce income less than an accelerated method in the first years of depreciation. In the later years, accelerated depreciation method will reduce income less than a straight-line method.

The use of historical costs for pricing an asset acquisition also causes problems in using accounting information. Such reliance on historical cost is particularly troublesome in times of high inflation, because historical cost values are no longer representative of the underlying values of the assets and liabilities of the firm. But, nowadays the accountants are developing replacement costs and other inflation- adjusted accounting procedures.

4.2 Methods for improvement

Three possible methods for improving the representiveness or accuracy of accounting information in financial analysis and planning are the use of alternative information, of statistical tools, and of finance and economic theories.

a. Use of alternative information

One of the many types of different information that should be used to improve the accounting data, the most practical and consistent type is market information. Stock prices and replacement costs can be used to adjust reported accounting earnings. According to the theory of efficient capital markets, the market price of a security represents the market's estimate of the value of that security.

b. Statistical adjustments

By using a time-series decomposition technique suggested by Gentry and Lee (1983), quarterly earnings could be divided into three components trend cyclical, seasonal and irregular. This decomposition procedure can be used to remove some undesirable noise associated with accounting numbers. Therefore this statistically adjusted accounting earning data can be used to improve its usefulness in determining a firm's market value.

For long-term financial planning and analysis, the trend-cyclical component is the major source of information. The seasonal and irregular components introduce noise, which clouds the analysis and this noise can be removed. **For short-term planning** (or intermediate term) planning and analysis, **the seasonal component also produces valuable information.** Thus, both trend cycle and seasonal components should be used in working capital management. It should also be remembered that moving average or other statistical method could eliminate the sources of noise

c. *Application of financial and economic theories*

There are the M&M valuation theory, the capital asset pricing theory and option pricing theories. By applying these theories one can adjust accounting income to obtain a better picture of income measurement, i.e., finance income (cash flow). Also the use of finance theory combined with market and other information gives an analyst another estimate of income measurement. In addition, the various earnings estimates can show additional light on the firm's value determination. To do these kinds of empirical tests, Lee Zumwalt (1981) have used a multiple regression model to investigate the association between six alternative accounting profitability measures and security rate-of-return determination. Their empirical results suggested that accounting profitability information is important extra-market component information in asset pricing.

4.3 Static determination of financial ratio

In order to make use of financial statements, an analyst needs some form of measure for analysis. Frequently, ratios are used to relate one piece of financial data to another. The ratio puts the two pieces of data on an equivalent base, which increases the usefulness of the data. For instance, net income as an absolute number is meaningless to compare across the firms' different sizes. If one creates a net profitability (NI/Sales), however, comparisons are made easier. Analysis of series of ratio will give us a clear picture of firm's financial condition and performance.

Analysis of ratios can take one of two forms. First, the analyst can compare the ratios of one firm with those of similar firms or with industry averages at a specific point in time. This is one type of cross-sectional analysis technique that may indicate the relative financial condition and performance of a firm. One must be careful, however, to analyze the ratios while keeping in mind the inherent differences between firms' production functions and operations. Also, the analyst should avoid using "rules of thumb" across industries because the composition of industries and individual firms varies considerably. Furthermore, inconsistency in a firm's accounting procedures can cause accounting data

to show substantial differences between firms, which can hinder comparability through the use of ratios. This variation in accounting procedures can also lead to problem in determining the target ratio.

The second method of ratio comparison involves the comparison of a present ratio with the same firm's past and expected ratios. This form of time-series analysis will indicate whether the firm's financial conditions has improved or deteriorated. Both types of ratio analysis can take one of the two following forms: static determination and analysis, or dynamic adjustment and its analysis.

The static determination of financial ratio involves the calculation and analysis of a ratio over a number of periods for one firm, or the analysis of differences in the ratios among individual firms in one industry. An analyst must be careful of extreme values in either direction because of the interrelationships between ratios. For instance, a very high liquidity ratio is closely to maintain, causing profitability ratios to be lower than they need be. Furthermore, ratios must be interpreted in relation to the raw data from which they were calculated, particularly for ratios that sum accounts in order to arrive at the necessary data for the calculation. Even though this analysis must be performed with extreme caution, it can yield important conclusions in the analysis for a particular firm. Financial ratio are indicated as

Liquidity ratio	Capital adequacy ratio
Activity ratio	Operating ratio
Efficiency ratio	Market based ratio
Profitability ratio	Cash flow ratio

All these different types of ratios have different characteristics stemming from the firm itself and the industry as a whole. For instance, the account recievables ratio is clearly the function of the billings, payment, and collection policies of the given industry. In addition, the fixed asset turnover ratios for those firms are different. This could imply that different firms have different capacity utilization.

4.4 Dynamic Analysis of financial ratios

In basic finance and accounting issues, industry norms are generally used to determine whether the magnitude of firm's financial ratio is acceptable. Taken separately, ratios are mere numbers. This can lead to some problems in making comparisons among and drawing conclusions from them. In addition, by making only static, one ratio to another comparison, it could not be taken advantage of all information they can provide. A more dynamic analysis can improve the ability to compare companies with one another and to forecast future ratios. Regressing current ratio against a past ratio helps one analyze the dynamic nature and the adjustment process of firm's financial ratio.

Single-equation dynamic adjustment process

1. Basic model

Lev (1969) has used the concept of the partial adjustment model to define a dynamic financial ratio adjustment process as:

$$Y_{j,t} = Y_{j,t-1} + \delta_j(Y^*_{j,t} - Y_{j,t-1}), \qquad (4.1)$$

where $0 \leq \delta_j \leq 1$, and

δ_j = a partial adjustment coefficient,

$Y_{j,t}$ = firm's financial ratio in period t,

$Y_{j,t-1}$ = firm's financial ratio in period t and,

$Y^*_{j,t}$ = firm's financial ratio target in period t.

This model can be used in a wide variety of empirical applications of the dynamic properties of financial analysis and forecasting such as the investment, financing and dividend decisions, and forecasting. The relationship postulates that at any time *t* only a fixed fraction of the desired adjustment is achieved in that period. Thus, the coefficient of adjustment reflects the fact that there are limitations to the periodic adjustment of ratios.

Lev has suggested that differences across ratios in their speed of adjustment coefficient are a function of two conflicting types of costs: a) the cost of adjustment and, b) the cost of being out of equilibrium. These two costs must be balanced for each ratio. Equation (4.1) implies that a firm's current financial ratio is equal to the last period's financial ratio plus an adjustment term. The adjustment factor depends upon two elements: the partial adjustment coefficient δ_j, and the difference between $Y^*_{j,t}$ and $Y_{j,t-1}$. However, $Y^*_{j,t}$ is not an observable variable, so it must be found some alternative proxy.

To solve the problem associated with determining the target ratio Lev has assumed that: (1) $Y^*_{j,t}$ is exactly equal to the industry average of the jth financial ratio in the previous period, denoted as $X_{j,t-1}$ and (2) $Y^*_{j,t}$ is proportion to $X_{j,t-1}$, that is $CX_{j,t-1}$ where C is the related proportion constant. A generalized proxy of $Y^*_{j,t}$ can be defined as:

$$Y^*_{j,t} = CX_{j,t-1} + \acute{r}_{j,t}, \qquad (4.2)$$

Where $0 \leq C \leq 1$, and $\acute{r}_{j,t}$ represents the proxy error. Proxy error is the error arising form the fact that the substitute, or proxy, ratio only partially approximates the desired target ratio. If C=1 and $\acute{r}_{j,t} = 0$, then $X_{j,t-1}$ is the perfect proxy for $Y^*_{j,t}$. Then $X_{j,t-1}$ can be substitute for $Y^*_{j,t}$ in Eq. (2.7) and obtain:

$$Y_{j,t} - Y_{j,t-1} = \delta_j[X_{j,t-1} - Y_{j,t-1}] \qquad (4.3)$$

In order to estimate the partial adjustment coefficient, δ_j, simple time regression can be run and used in the empirical study. The linear form of this regression is defined as:

$$Z_{j,t} = A_j + B_j W_{j,t-1} + \varepsilon_{j,t}, \qquad (4.4)$$

where

$Z_{j,t} = Y_{j,t} - Y_{j,t-1}$;

$W_{j,t-1} = X_{j,t-1} - Y_{j,t-1}$

A_j and B_j = regression parameters, and

$\varepsilon_{j,t}$ = The error term

2. Extension of this model

Lev has also a log-linear form of this model in order to study the dynamic ratio-adjustment process:

$$Z'_{j,t} = A'_j + B'_j W'_{j,t-1} + \varepsilon_{j,t} \qquad (4.5)$$

Where $Z'_{j,t} = \log(Y_{j,t}) - \log(Y_{j,t-1})$

$W'_{j,t-1} = \log(X_{j,t-1}) - \log(Y_{j,t-1})$

And $\varepsilon_{j,t}$ = The error term

One of the possible advantages of the log-linear form of this model over the linear form is that the estimated B'_j represents the elasticity of change, while the estimated B_j does not. The argument is based upon the facts:

$$B'_j = \frac{\Delta \log(Y_{j,t} / Y_{j,t-1})}{\Delta \log(X_{j,t-1} / Y_{j,t-1})} = \frac{\%\text{ change in } [Y_{j,t} / Y_{j,t-1}]}{\%\text{ change in } [X_{j,t-1} / Y_{j,t-1}]}.$$

This model can be generalized by assuming that optimal ratio level attained by the firm is last period's industry ratio average times an adjustment factor, as follows:

$$Y^*_{j,t} = C X_{j,t-1}$$

The adjustment coefficient, C, indicates that firms tend to maintain a fixed deviation from the industry mean in their adjustment process. Furthermore, the analysis of the coefficient and the partial adjustment coefficient (δ_j), should be helpful in demonstrating the dynamic nature of a firm's financial structure, its financial ratios, and their adjustment toward the industry.

As far predicting future ratios, Lev found that the model's predictive powers can be enhanced substantially through the following extensions to multiple regressions:

$$Y_{j,t} = \hat{A}_j + B_j X_{j,t-1} + B_j Y_{j,t-1} + \varepsilon_{j,t} \qquad (4.6)$$

This model was found to be substantially more accurate in prediction of future ratio, while the model in Eq. (4.4) is better at estimating the partial adjustment coefficient B_j. With this model, analysis can forecast future possibilities. Furthermore, once the future ratios are estimated, one can work backwards and determine the estimating levels of individual accounts. This procedure facilitates planning ahead to meet unpleasant future economic situations.

4.5 Important concepts of linear algebra

Financial ratios are widely used in all financial analysis and planning. Banks use a firm's current and quick ratios to determine acceptability for commercial loans; the leverage ratio is used as a proxy for a firm's capital measure in predicting bankruptcy and to analyze the impact of the leverage on the market value of the firm. Furthermore, for financial planning and forecasting, firm managers use activity ratios, that is, the asset turnover ratio and the inventory turnover ratio, to determine the total amount of assets required to sustain a level activity. In financial analysis and planning determination, lenders or managers need to measure a customer's short-term or long-term financial position. The well-known statistical techniques of factor analysis and discriminant analysis can be used in such instances to identify important financial ratios and to construct an overall financial indicator, that is, "financial z-score".

Here the linear algebra needed for factor analysis, discriminant analysis, and portfolio analysis is reviewed in accordance with the basic concepts of algebra.

In performing financial analysis and planning, the most important concepts of linear algebra that are needed are:

1. Linear combination and its distribution.
2. Operation of vectors and matrices.
3. The linear equation system and its solution.

Linear combination and its distribution

If $X_1, X_2, \ldots, X_n$ are one set of variables, then a linear combination of these variables is :

$$Y = a_1X_1 + a_2X_2, \ldots, a_nX_n. \qquad (4.7)$$

In financial analysis $X_1, X_2, \ldots, X_n$ can be used to present amounts of i products ($i = 1, 2, \ldots, n$) to be purchased. The a_i coefficients ($i = 1, 2, \ldots, n$) can be used to represent the total profit of the firm of producing one unit or product i; Y can represent the total profit of the firm. The variables of linear combination will be used as an objective function (min or max) for portfolios analysis, linear programming in performing capital rationing, and financial planning, analysis, and forecasting.

In both factor analysis and discriminant analysis the variables used to obtain a linear combination are generally random instead of deterministic.

In calculating the financial z-score, Equation (4.7) can be rewritten as

$$\check{z} = a_1x_1 + a_2x_2, \ldots, a_nx_n, \qquad (4.8)$$

where the x_i's (i= 1, 2,. . ., m) represent the related financial ratios; $\check{z}$ is financial z-score. The financial ratio are used to compare the financial z- score, can be either normally or log-normally distributed. If x_i's are normally distributed, then Anderson (1958) and others show that $\check{z}$ is normally distributed. If x_i, σ_i^2 are the mean and the variance respectively, and ρ_{ij} is the correlation coefficient between x_i, and x_j, then the mean and variance of $\check{z}$ can be defined as:

$$\sigma_z^2 = a_i^2\sigma_i^2 + 2\sum\sum_{i>j} a_i a_j \sigma_{ij}\sigma_i\sigma_j \qquad (4.11)$$

$$\check{z} = \sum_{i=1}^{m} a_i x_i$$

where the symbol $\Sigma\Sigma_{i>j}$ denotes summation over all possible pairs of i and j values in the range from 1 through m, with the restriction that i is at least one greater than j. if i =2,

$$\sigma_2^2 = \sum a_1^2\sigma_1^2 + a_2^2\sigma_2^2 + 2a_1a_2\rho_{12}\sigma_1\sigma_2 \qquad (\rho_{12}\sigma_1\sigma_2 = \sigma_{12})$$

if i = 3, then

$$\sigma_2^2 = \sum a_1^2\sigma_1^2 + a_2^2\sigma_2^2 + \sigma_3^2\sigma_3^2 + 2a_1a_2\rho_{12}\sigma_1\sigma_2$$
$$+ 2a_1a_3\rho_{13}\sigma_1\sigma_3 + 2a_2a_3\rho_{23}\sigma_2\sigma_3$$

Vectors, matrices and their operations

In estimating financial z-scores, time-series ratio data is necessary in order to estimate the coefficients $a_1, a_2, \ldots, a_m$. Under this circumstance, the X_i's (i =1, 2, . . ., m) are vectors. If the current ratio (X_1) and the leverage ratio (X_2) are the only two ratios to be used in estimating z, then time-series financial ratio data can be written in terms of vectors as:

$$X_1 = \begin{bmatrix} X_{11} \\ X_{12} \\ \vdots \\ X_{1n} \end{bmatrix} \quad \text{and} \quad X_2 = \begin{bmatrix} X_{21} \\ X_{22} \\ \vdots \\ X_{2n} \end{bmatrix},$$

Where Xij represents the ratio i in time period j. Vector X_1 and vector X_2 can be used to formulate a matrix of the ratios used in computing the financial z - score:

$$X = \begin{bmatrix} X_{11} & X_{12} \\ X_{21} & X_{22} \\ \vdots & \vdots \\ X_{n1} & X_{n2} \end{bmatrix}$$

To represent all observation of financial ratio for factor or discriminant analysis, matrix can be generalized as:

$$X = \begin{bmatrix} X_{11} & X_{12} & \cdots & X_{1m} \\ X_{21} & X_{22} & \cdots & X_{2m} \\ \vdots & \vdots & & \vdots \\ X_{n1} & X_{n2} & \cdots & X_{nm} \end{bmatrix}$$

In portfolio analysis, when i is three the variance of portfolio can be written in vector and matrix notation as followings:

$$\sigma^2 = \underset{A'}{(a_1 a_2 a_3)} \underset{B}{\begin{bmatrix} \sigma_1^2 & \sigma_{12} & \sigma_{13} \\ \sigma_{21} & \sigma_2^2 & \sigma_{23} \\ \sigma_{31} & \sigma_{32} & \sigma_2^3 \end{bmatrix}} \underset{A}{\begin{bmatrix} a_1 \\ a_2 \\ a_3 \end{bmatrix}}$$

Where B is a 3 × 3 covariance matrix, σij represents the covariance between x1 and x2, A is a 3 × 1 coefficient vector, and A' is the transposition of A.

Linear equation system and its solution

It is clear that a general linear-equation system (AX=B) can be written in matrix form. So the solution of linear equation can be obtained either by the derivation of the inversion of A or by using Cramer's rule. In order to take the inverse of a matrix, the matrix must be a nonsingular square matrix.

Cramer's rule can also be used to obtain the solution as:

$$x_i = \frac{|\hat{A}_i|}{|A|},$$

where $\hat{A}_i$ is the matrix obtained from A by replacing the column ith with constant vector. Both $|\hat{A}|$ and |A|represent the determinants.

The application using Cramer's rule to estimate simple regression coefficient for two parameters can be solved from the given information: $\Sigma^{n}_{t=1} X_{t-1}$; $\Sigma^{n}_{t=1} Y_t$; $\Sigma^{n}_{t=1} X^2_{t-1}$; $\Sigma^{n}_{t=1} X_{t-1} Y_t$.

$$b = \frac{\begin{vmatrix} n & \sum_{t=1}^{n} Y_t \\ \sum_{t=1}^{n} X_{t-1} & \sum_{t=1}^{n} X_{t-1} Y_t \end{vmatrix}}{\begin{vmatrix} n & \sum_{t=1}^{n} X_{t-1} \\ \sum_{t=1}^{n} X_{t-1} & \sum_{t=1}^{n} X^2_{t-1} \end{vmatrix}}$$

After simplification

$$B = \frac{Cov[X_{t-1}, Y_t]}{Var[X_{t-1}]}$$

$$a = \frac{\begin{vmatrix} \sum Y_t & \sum_{t=1}^{n} X_{t-1} \\ \sum_{t=1}^{n} X_{t-1} Y_t & \sum_{t=1}^{n} X^2_{t-1} \end{vmatrix}}{\begin{vmatrix} n & \sum_{t=1}^{n} X_{t-1} \\ \sum_{t=1}^{n} X_{t-1} & \sum_{t=1}^{n} X^2_{t-1} \end{vmatrix}}$$

After simplification:

$$a = \overline{Y} - \overline{X}b$$

This technique can also be used to estimate optimal portfolio weighs.

$$\hat{a} = \overline{Y} - \overline{X}\hat{b}$$

The $AX = b$ is a general equation system. If all elements ($b_i \ldots b_n$) are zero, then it is a homogeneous equation system. A special case of homogeneous equation system can be written as:

$$(A-\lambda I)\, X=0,$$

where A and X are identical to the AX = b, λ is an known scalar quantity, and I is an m×n vector with all unity elements. There is a trivial solution (X = 0) and a nontrivial solution ((A - λI) = 0) for this set of homogeneous equation.

Tatsuoka (1971), Moore (1968), and Anton (1981), others show that the above equation poses a nontrivial solution that is

$$|A - \lambda I| = 0,$$

which is called the characteristic equation of Matrix A.

Conceptually, the existence of this characteristic can be justified as follows:

If $|A - \lambda I| = 0$, then A - λI is not a singular matrix, and hence it possesses an inverse, then premultiplying both sides of (A-λI) X=0 by $(A-\lambda I)^{-1}$ will yield $x = (A-\lambda I)^{-1}0 = 0$; that is, the trivial solution is the only solution of the equation. Therefore, it can be concluded that in order for a set of homogemeous equations to possess a nontrivial solution there must exist a charcteristic solution as defined in the following equation:

$$|A - \lambda I| = 0,$$

To obtain the nontrivial solution, it should be first find the unknown scalar quantity λ. The scalar λ is called an eigenvalue of A, and X is said to be an eigenvector[16] corresponding to λ.

[16] One of the meanings of the word "eigen" in German is "proper", eigen values are also called proper values, characteristics values, or latent roots.

5. The analysis and management of cash flow

In order to analyze and manage cash flow, first, I deal with funds flow statement and its history in developing managing and handling financial situation of the firm. And I emphasize also on its developed concept and the importance of cash flow statement as well as its preparation.

But the main purpose of this topic is to examine the cash flow statement, the way it provides better information about highly leveraged firm's financial health, the life cycle of the firm, and the financial flexibility. The results are examined in terms of their contribution to the firm's financial needs and enhancing sales in order to control how the firm's financial condition could satisfy its obligation.

The funds flow statement give a guide how to differentiate the sources and uses of cash. The funds flow statement is using the information provided by the firm's financial statements. As it is already mentioned the changes in balance sheet, the funds flow classified into two categories as sources and uses of cash. This classification was not clear, because the operating, investing and financing activities were not separated. So this situation even though, it contributes for the managing financial matters, it was not good instrument for planning and control of financial situation of the firms as well for decision making. The pioneer researchers simplify the changes occurred in the balance sheet according to their activities. This result provides with the information where the big change occurred? Why did the results become like this? Does the accounting principle influence the cash flow statements? What should be the remedy?

The key point will be that the cash flow statement provides the best information about a highly levered firm's financial health, not the income statement.

Of course, dealing with cash flow statement will not tell the analyst that the firm's stage of development. Thinking about the types of problems that a firm is likely to encounter at a particular point in its life cycle can, however, steer the analyst into the most pertinent areas of further investigation.

Prior to that time, going back as the introduction of double entry accounting in Italy during the fifteenth century, financial analysts had muddled through with only the balance sheet and the income statement. Anyone with it sense of history will surely conclude that the introduction of the cash flow statement must have been premised by expectation of great new analytical insights.

The advantage of a cash flow statement corresponds to the shortcomings of the income statement, and more specifically, of the concept of profit, which is discussed under liquidity analysis and management about economic concept.

5.1 The funds flow statements

A statement that illustrated a flow of funds existed as early as 1862 in Britain and 1863 in America.[17] Although the concept of issuing a statement that presented a flow of funds is over 100 years old, it is relatively new when compared with balance sheet and income statement.

By 1903, there were at least four conceptually different statements. These were cash, current assets, working capital, and all financing activities in a period.

In the period from the 1910s to late 1920s, H.A. Finney led a drive to present the statement using a format that showed the cause of change in working capital. Finney was successful, and the working capital approach became the dominant format for presenting statement. Items that increased working capital were regarded as sources of funds, and items that decreased working capital were considered as uses of funds.

In 1978, the FASB issued Statement of Financial Accounting Concepts No. 1, "Objectives of Financial Reporting by Business enterprises." Several of the objectives of financial reporting identified by Concept Statement No. 1 emphasized the importance of cash flow. For example, paragraph 39 stated that "since an enterprise's ability to generate

favorable cash flows affects both in ability to pay dividends and interest and the market prices of its securities. Expected cash flows to investors and creditors are related to expected cash flows to the enterprise in which they have invested or to which they have loaned funds." [18]

During the 1980s and prior to adoption of SFAS, many managers in USA began to place less emphasis on changes in net working capital and more on cash flows, the change in cash flow and near-cash flow balances in an effort to better understand, liquidity. Cash inflows and outflows represent the most fundamental and prevalent economic events engaged by companies. Cash is significant because it represents generalized purchasing power, which can be transferred readily to satisfy obligations. Cash planning –specifically understanding the sources and uses of current and future cash flow needs – often makes the difference between success and failure. Echoing this importance, future magazine opines that "the cash is king and will reign for a long time".

The most visible and dramatic reason for the greater attention being paid to cash flow is the 1980s' increased use of take-over and levered buyouts (LBO). Raiders and "buyout artists" gabbling up whole companies have paid huge premiums over current market prices based on earnings because they see higher value based instead on cash-flow -- and, of course, they need their target companies' cash to service the debt they pile up to finance the deals.

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17 L.S. Rosen and Don T. DeCoster, "Funds' statement : A Historical Perspective," The Accounting Review (January 1969), p.125/

18 Statement of Financial Accounting Concepts No. 1., "Objectives of financial Reporting by Business Enterprises," (Stamford, conn.: Financial Accounting Standards Board, 1978).

5.2 The importance of cash flow statement

Traditionally, published accounts companies have comprised a profit and loss account showing the amount of profit in the business during the year and balance sheet showing the amount and classification of assets how they were financed. In addition, comparative figures are required for all profit and loss and balance sheet items. However, for a fuller understanding of the company's affairs it is also necessary to identify the movement in assets, liabilities and capital which have taken place during the year and the resultant effect on net liquid funds. **In other words, a firm may be earning large amount of profit but not generating a great deal of cash.** A cash flow statement that shows the movement cash funds between successive balance sheets explains this apparent inconsistency. The cash flow statement explains the change in the net liquid funds which is essentially the firms' cash at bank and in hand less other borrowings repayable within one year of the accounting date.

Business that manages cash effectively benefit in numerous ways, for example, they benefit through lower financing costs. By accurately forecasting the amount and timing of cash flows, managers minimize loan draws, thus lessening interest expense. In addition, improving the amount of cash internally generated decreases the need for soliciting external financing, thus preserving proportionate value and unused debt capacity. Cash is also paramount for external users of financial statements.

Stockholders and creditors are seldom settled by other means than cash. Therefore, cash flow information is very important to enable these users to assess a firm ability to generate cash flow form operations, and to meet its maturing obligations, and to pay dividends. Cash flow information can also provide important insights regarding a company's continuing investment in productive assets and assessing the quality of its earning.

Management can "message" earnings numberless to achieve an attractive financial profile of the firm. It can defer discretionary expenses such as advertising or reduce last in first out (FIFO) inventory. Firms can also count as income money that has been billed but not

received. These ideas do not mean that earnings figures are useless. But there are situations where the reported earnings can be misleading. In addition to providing a check on the quality earning, Cash flow smoothes the comparison of companies with different accounting methods.

Concerning the quality of its earnings, accurate accounting often masks a company's cash flow under the accrued basis of accounting, revenues are recognized at the time of sales not when the cash is received. This credit sale increases net income but not current cash flow. The account basis of accounting also acknowledges such non-cash expenses as depreciation, amortization, and differed tax and accrued warranty estimates, which reduces net income and further widens the gulf between it and cash flow.

From a balance sheet perspective when a business enters into loan agreement, the loan is reflected as increase in loan payable. As the loan is repaid, cash outflows increase and the loan payable balance decreases. At no time, however, does any record of the cash flow from the loan principal payments appear in the income statement, only the interest expense appears. For this sort of reasons, a business can easily find itself with an income statement showing an attractive net income without enough cash for tomorrow's tax bill, payroll, dividend, and purchase deposit or loan payments. Profit alone cannot make these payments – managers must manage both timing and amount of cash flows.

When used in conjunction with the other financial statements, the statement of cash flow is useful in analyzing both past and future profitability and solvency of a firm. A company could be profitable and yet short of cash funds. This would typically be the case of profitable firm that has invested heavily in fixed assets but without recourse to long term borrowings. Alternatively, it may have large investments in both stocks and debtors.

The objective of the cash flow statement is to show the manner in which the operations of the business have been financed as well as showing how its financial resources have been used. The format selected should be designed to achieve this objective. It should clearly show the funds generated or absorbed by the operation of the

business and the manner in which any resulting surplus of liquid assets has been applied or any deficiency of such assets has been financed.

The purpose of the statement of cash flow is to highlight the major activities that have provided cash and that have used cash during period, and also to show the result effect on the overall cash balance. The statement is a powerful analytical tool that can be used by managers, investors, and creditors in the following ways:

- To determine the amount of cash provided by operations during a period and to reconcile this amount with net income.
- To asses an organization's ability to meet its obligations as they come due and to assess its ability to pay cash dividends.
- To determine the amount of investment in new plant, equipment, and other concurrent assets during a period.
- To determine the type and extent of financing required to expand the investment in long-term assets or to bolster operations.
- To assess an organization's ability to generate a positive cash flow in the future periods.

5.3 Preparation of cash flow statements

FASB Statement No. 95, (Statement of Cash Flows) directs that (1) the statement be prepared on cash basis; (2) the title be " The Statement of Cash Flows"; (3) a fairly specific and detailed format be used.

This statement allows the person, who prepare to use a concept of cash that includes not only cash itself but also short-term, highly liquid investments. This is referred to as " cash and cash equivalent" focus. The category cash and cash equivalents include cash on hand, cash on deposit, and investments in short-term, highly liquid investments.

A cash flow statement is superior to a funds flow statement that balances to changes in net working capital since it shows the activities reported in the income statement were financed. It also summarizes in the assets, the liabilities and the capital as shown in the related balance sheet. The cash flow statement summarizes the business transactions involving cash receipts and cash disbursements without considering their relationship to revenue-producing activities and the process of matching revenues and expenses.

The main purpose of the statement of cash flows is to provide the user with information as to why the cash position of the firm changed during an accounting period. In addition, the cash flow statement or supporting schedules must be disclosed the effect of all investing and financing transactions of the period.

Instead of lumping current assets and current liabilities together as net working capital, a cash flow statement considers changes in some or all of these separately. **Cash flows are classified according to operating, investing and financing activities.** It will be outlined how cash flows are allocated to investing, financing and operating activities. The cash flow from operating activities is the first section of the statement of cash flow, SCF, and it may be presented using either the **direct method** or the **indirect method**. At a minimum, the cash flow from operating activities should be reported as the difference between the receipts and payments pertaining to the following separately reported categories:

- Cash inflows

    From the sales of goods or services

    From return on loans

    From return on equity

Other receipts of operating cash, if any, such as insurance and lawsuit settlements and refunds from suppliers.

- Cash outflows

    Payments for wages and other goods and services received.

    Payments to employees

    Payments to interest expenses

    Payments governments (taxes)

    Payments to suppliers for other expenses

Other disbursements of operating, if any, such as charitable contribution, refund to customers, and lawsuit settlements.

The cash flow from operations metric is important to the users of financial statements because it clearly details, more than any other single bit of information, the quality of the earnings of a firm. It informs the user whether the firm is a net provider or a net user of cash, cash must be provided by other means, such as liquidation of investments, financing activities, or the carrying of decreased reserves of cash and cash equivalents. If, on the other hand, the operating activities provide cash, and then cash is available to invest in the business, repay prior financing, or increase the cash reserves of the firm.

The next section of statement of cash flow is cash flow from investing activities – the uses and provisions of cash from investments. It details the discretionary amounts a firm invests or reinvests in the business, in equity investments in other firms, and in purchases and disposition of other assets.
Investing sections should consist of the followings:

- Cash inflows

    From receipts

From loan

From sales of debt or equity securities of other corporations

From the sale of property, plant, and equipment

- Cash outflows

  Loans to other entities

  Purchase of debt or equity securities other entities

  Purchase of property, plant, and equipment

If cash flow from operations was less than the net cash used for investments, then cash must have been provided from the final statement of cash flow section- the financing activities. The cash flow from financing activities shows changes in the capital structure of the firm and dividend payments made to provide a return to investors on their investments in the firm.

Financing:

- Cash inflows

  From the sale of equity securities

  From sale of bonds, mortgages, notes, and other long-term borrowings

- Cash outflows

  Payment of dividends

  Repurchase of the firm's capital stocks

  Payments of amount borrowed

The statement of cash flows presents cash flows from operating activities first, followed by investing activities and then financing activities. The individual inflows and outflows from investing and financing activities are presented separately.

5.3.1 The preparation of direct and indirect method

The operating activities section can be prepared using the "direct method" and "indirect method," the direct method essentially presents the income statement on a cash basis. In the other wards, the direct method presents major classes of cash receipts and disbursements. The indirect method adjusts net income for items that affected net income but not affect cash. **The total amount that reported for cash flow from operating activities should be equal either using the direct or indirect method**. The indirect method, contrasted with direct method in Figure 5.1, is based on the reconciliation of net income to operating cash flows.

The net result of the cash inflows and outflows arising from day-to-day operations is known formally as "Net cash provided by operating activities." It is possible to compute this figure by either the direct method or the indirect method.

Under ***the direct method,*** the income statement is reconstructed on a cash basis from top to bottom. Cash collected from customers is used in place of sales; payment to suppliers is applied in a place of cost of goods sold; and payment to employs for services, payment to insurance and so on are presented in place of operating expenses,. The net results between the cash receipts and cash payments represent the "Net cash provided by operating activities" for the period.

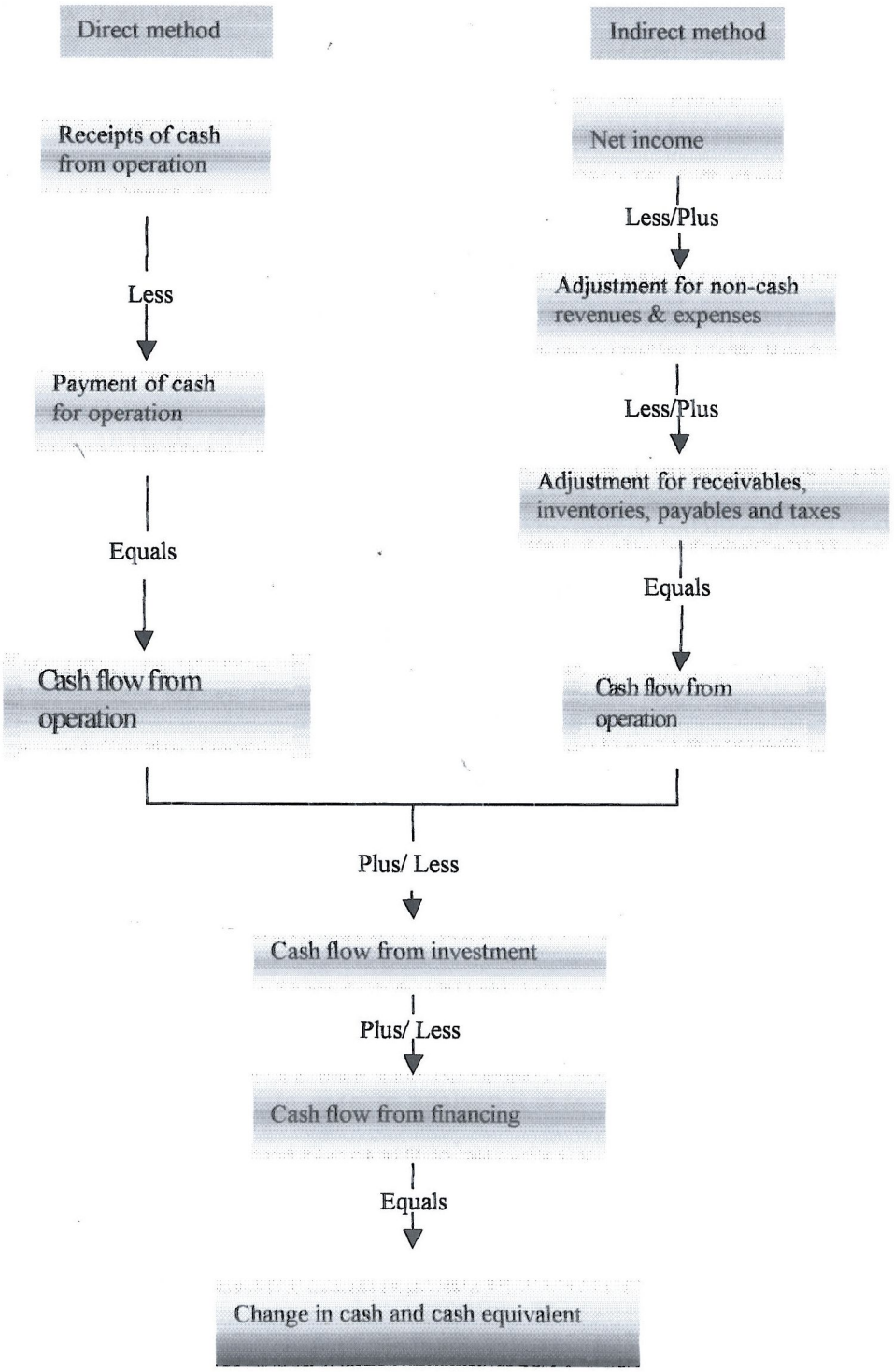
Under the ***indirect method***, the "Net cash provided by operating activities" is computed by starting with net income and adjusting the net income figure to a cash basis. That is, rather than making direct adjustments to sales, cost of goods sold, and other income statement items in order to compute the "Net cash provided by operating activities," these adjustment is made indirectly through the net income figure. The indirect method is also known as the reconciliation method.

Management can present operating cash flow either indirectly, using a reconciliation format between net income and net cash flow from operating activities, or directly by

presenting major classes of operating cash receipts (such as those from customers) and cash

Figure 5.1

Statement of Cash Flows, Direct versus Indirect Methods[19]



payments (such as those to those suppliers). The direct method effectively presents income statement information and a cash basis rather than accrual basis. This approach presents of the income statement in a format that is closer to the economist's concept of revenue and expense.

If cash flow from operations is positive, the firm may wish to reduce its debt loads or buy back some of its shares. These choices must be considered in light of the company's capital expenditure needs.

5.4 Analysis of cash flow statement

Cash flow analysis depends heavily on a distinguishing and an understanding of commonly accepted accounting methods, since accounting statements are used as the basis for financial analysis. Two sequentially related balance sheets of one firm are serve to show the net effect of transaction from the time interval of accounting period at the beginning to the time interval at the closing period at the end. The left-hand column of balance sheet shows the way in which resources have been used and the right hand column of balance shows from which resources have been obtained. Since balance sheets with total assets equaling total financing, analysis of changes in the balance sheet from one period to another period results in analysis of sources and uses of resources. Total sources of resources must equal total uses of resources.

The statement of cash flow summarizes the firm's cash flow over a given period of time. Because it can be used to capture historic cash flow, the key aspects of the statement are discussed in this section. In order to analyze it is necessary to understand the firm's cash flow and the classification of sources and uses of cash.

The marketable securities are considered the same as cash, because they are highly liquid in nature. Both cash and market securities represent a reservoir of liquidity that is increased by cash inflow and decreased by cash outflow. It is clear that the cash flow has three components, which are operating, investing and financing flows. Incurring and

repaying either short-term debt or long-term debt would result in a corresponding cash inflow or outflow. Similarly, the sale of stock would result in a cash flow; the payment of cash dividends or repurchase of stock would result in financing outflow. In combination, the firm's operating, investing, and financing cash flows during a given period will affect the firm's cash and marketable securities balance.

The advantages of a cash flow statement correspond to the shortcomings of the income statement, and more specifically, of the concept of profit. Over time, profit has proven so malleable a quantity, so easily enlarged or reduced to suit management's needs, as to make it useless, in many instances, as the basis of a fair comparison among companies.

5.4.1 Cash flow analysis in terms of public or private owned firms

The main idea is when the analysts want to compare the results of cash flow industrial wise attention should be given to those companies are owned either by private or public. Publicly owned companies generally seek to maximize its reported net income, which investors use as a basis for valuing its shares. Therefore, their motivation in any situation where the accounting rules permit discretion is to minimize expenses. The firm will capitalize whatever expenditures it can and depreciate its fixed assets over as long as a period as possible. All that restrains the public enterprise in this respect is the wish to avoid being perceived as employing liberal accounting practice, which may lead to a lower market valuation of its reported earnings. Using depreciation schedules much longer than those of other companies in the same industry could give rise to such a perception.

On the other hand, a privately owned firm has no public shareholders to impress. This type firm only shows one set of statements Internal Revenue Service, where as public firm shows one set of statement to the investors and creditors, and another to the Internal Revenue Service. A private owned firm seeks to minimize its profit before tax in order to pay less tax. When analysts examine its income statement and attempts to compare it with

those public firms in the same industry, the result will be an undeservedly poor showing by private firm.

5.4.2 Applying cash flow analysis in leverage buyout firms

When somebody wants to analyze the cash flow during takeovers, important should be given in analyzing the firm leverage buyout (LBO) situation. Let's assume that the imagined is the following. If group of investors acquires a business by putting up a small amount of equity and borrowing the balance of the purchase price. This means when the borrowing percentage is more than the equity percentage (for instance borrowing is 85% of the total capital in table (4.1). From this sentence it can be reduced that the firm has highly leveraged capital structure, and this leads to large interest expenses, which results the formerly profitable firm reports loss in its first year as an LBO. Nobody can say that the investment is an attractive opportunity for the lenders. The wisdom of lenders is also questionable who provide funds to a firm that is assured of loosing money.

Table 5.1

Leverage buyout forecast (000,000)
Capitalization
During the acquisition period on December 31,

Senior debt	$ 1750	50%
Subordinated debt	1225	35%
Total debt	2975	85%
Equity capital	525	15%
Total capital	$ 3500	100%

Projected income statement

	Actual LBO	I	II	III	IV	V
Sales	$ 2001	$ 2101	$ 2206	$ 2316	$ 2432	$ 2554
Cost of sales	1120	1176	1235	1297	1362	1430
Depreciation	140	147	154	162	170	178
S&A expenses	400	420	441	463	486	510
Operating income	341	358	376	394	414	436
Interest expense	98	371	371	369	357	363
Income before taxes	243	(13)	5	25	57	73
Provision for income taxes	85	4	2	8	17	25
Net income	$ 188	$ (9)	$ 3	$ 17	$ 40	$ 48

The expected sales are thought to bring $ 2101 million in cash during the accounting period of the first year, of course, to reach this amount of sales there was cash outlay. So the expenditure include cost of sales, $ 1176 million, selling, general, and administration expense, $ 420 million, and interest expense, $ 371 million, for a total of $ 1967 million. When depreciation of $ 147 million is added total expenses of $ $ 2114 result in $ 13 million pretax loss. However, the amount of depreciation does not represent an outlay of cash in the current year; it is intended to represent the gradual reduction in value and to satisfy the rule of bookkeeping. So the difference of sales and cash outlays represents the fund generated by the leverage buyout firm.

As it can be observed the projected income in the first year is negative, but under the projected cash flow, cash generation slightly exceeds cash use. Another thing that can be observed form the projected income statement is the shareholders do not take dividends but dedicate any surplus cash generated to the reduction of debt.

Projected cash flow

	I	II	III	IV	V
Net income	$ (9)	$ 3	$ 17	$ 40	$ 48
Depreciation	147	154	162	170	178
Cash from operation	138	157	179	210	226
Less: property and equipment additions	133	140	147	154	162
Cash available for obligation	$ 5	$ 17	$ 32	$ 56	$ 64

Projected capitalization

	I	II	III	IV	V
Senior debt	$ 1745	$ 1728	$ 1696	$ 1640	$ 1576
Subordinated debt	1225	1225	1225	1225	1225
Total debt	2970	2953	2921	2865	2801
Equity capital	516	519	536	576	624
Total	$ 3486	$ 3472	$ 3457	$ 3441	$ 3525

It can be observed that the projected income statement shows a steady increase in operating income as sales increase at a 5% annual rate. A gradual payment of debt causes interest expense to decrease a little bit, net income also increase over time. The same emphasis on cash flow, rather than reported earnings, is equally important in analyzing the down side in a leveraged buyout.

It is known that the shareholder owners do not reap such spectacular gains without incurring significant risk. There is a danger that everything will not go according to plan and that they will lose their entire investment. Specifically, there is risk that sales and operating earnings will fall short of expectations, perhaps as the result of are cession or because the investors' expectations unrealistically high at the outset. With a less debt-heavy capital structure, shortfall in operating earnings might not be worrisome. In a leveraged buyout, however, the high interest expense can quickly turn disappointing operating income into a sizable net loss. For instance, the projected sales were deviated

by 8% ($1933 million) in the first year; the loss may be so large that even after depreciation is added back. It should be noted that cost of sales, and selling, general and administrative expense increase by 8%, because the decrease in sales bring cost effects.

In this case, shareholders have to look for alternatives how to halt the cash drain. The firm can not decrease the operating expense, because they lack the cash required for the heavy interest expense it has incurred. Unfortunately, most of the choices available in the event they cannot cut costs sufficiently are unappealing. One of the alternatives is for investors to inject more capital into the business entity. If the investors of equity follow this alternative, what will be the cause? The cause could be a small percentage return on the equity invested besides the straining the investors' finances. Another possibility is the existing equity holders can sale equity to a new group of investors. The disadvantage of this strategy is that anyone putting in new capital at a time when the venture is perceived to be in trouble is likely to exact terms that will severely dilute the original investors' interest and, possibly, control. In other hand, harsh terms may also be expected form lenders who are willing to let the firm try to borrow its way out of its problems. A distressed exchange offer, in which bondholders accept reduced interest or a postponement of principal repayment, may more attractive for the equity holders but is likely to meet stiff resistance.

If all these alternatives prove unfeasible, the leveraged buy out firm will default on its debt. At that point, the lenders may force the firm into bankruptcy, which could result in a total loss for the equity investors. Another option is that the lenders may agree to reduce the interest rates on their loans and postpone mandatory principal repayments, but they will ordinarily agree to such concessions only in exchange for larger influence on the business entity's management. In short, once cash flow turns negative, the potential outcomes generally look bleak to the equity investors.

The key point here is the cash flow statement- not the income statement- provides the best information about highly levered firm's financial health. The cash flow statement is the most useful tool for analyzing highly leveraged business entities, because it reflects the true motivation of the firm's owners- to generate cash, rather than to maximized reported income.

5.4.3 The analysis of the firm's life cycle using cash flow

Until now it was dealt with levered buyout firm as the first thing to analyze in terms of cash flow, but it should not be also forgotten the importance of the firm's life cycle[20] in analyzing cash flow.

While privately held and highly leveraged companies illustrate most vividly the advantage of cash flow statement, the statement also has considerable utility in analyzing publicly owned and more conventionally capitalized firm. **One important application lies in determining where a firm is its life cycle- whether it is starting up, "taking off", growing rapidly, maturing, or declining.** Different types of risk characterize these various stages of the life cycle, so knowing which stage a firm is it can focus the analyst's efforts on the key analytical factors.

Business enterprises typically go through phases of development that are in many respects analogous to a human being's stage of life. It is useful when analyzing a firm to understand which portion of the life cycle it is in and which financial pitfalls it is therefore most likely to face.

Revenues build gradually during the start-up phase, during which time the firm is just organizing itself and launching its products. Growth and profits accelerate rapid during emerging growth phase, as the firm's products begin to generate the market and the firm achieves an economic scale of production. During the established growth period, sales and earnings growth decelerate as the market nears saturation. In the maturity industry phase, sales opportunities are limited to the replacement of products previously sold, plus new sales derived form growth in the population. Price competition often intensifies at this stage, as firms seek growth through increased market share. The declining industry stage does not automatically follow maturity, but over long periods some industries do not get swept away by technological change. Sharply declining sales and earnings, ultimately resulting in corporate bankruptcies, characterize industries in decline.

The characteristic growth patterns of firms at various stages in the firm life cycle correspond to typical patterns of cash generation and usage.

Start-up business entities are voracious cash users. They require funds to acquire facilities and pay the salaries of employees who plan the initial attempts to produce goods and make sales. With no revenues yet coming in, the risk is high that the organization will fail to gel. If its backers are not well capitalized, they may be forced to abandon the venture by unexpected delays in bringing the product to market or by unanticipated expenses.

The common characteristic of start-up business entities is a large need for external financing. Resources are needed to finance research and development and to market their product.

Emerging growth companies cash requirements outstrip their ability to generate cash. They must aggressively expand their productive facilities to capitalize on demand, but this requires more cash than they can generate from earnings and depreciation. Although they are beyond the start-up phase, these firms remain financially fragile. A growth industry typically attracts more start-up firms than the industry can ultimately support. Unless a firm can grow rapidly enough to achieve an economic scale of production, it will be one of the firms " shaken out" in the inevitable consolidation through both the absorption of some firms and the failure of others. An emerging growth business entity, then, has no choice but to grow rapidly if it is to survive, yet its management may lack the know-how to maintain control of operations, as the organization inevitably becomes more complex. Furthermore, a slump in demand for new stock of growth firms could prove fatal for a firm so dependent on external funding.

Established growth firms are more nearly able to fund their growth internally. Depreciation is substantial, and with a large portion of the potential market penetrated, the rate of required capacity additions slows down. Some of the problems of the rapid growth remain, but in less severe form. Having survived the industry shake out, the firm must now meet the challenges of intensifying competition for a more slowly growing

[20] In order to gain more information about a firm's product life cycle refer to Rekettye Gabor " Az Ár a Marketingben" Műszaki Könyvkiadó , Budapest, 1999.

market. Pitfalls include product obsolescence and failure to satisfy increasing sophisticated customers' demands for improved service support or a wider range of product options.

Mature industry firms have modest capital requirements. Demands for their products grow slowly, necessitating only a moderate pace of additions to manufacturing capacity. The sign of maturity can be faster growing; more cash-hungry firms attempt to retain a larger portion of earnings for reinvestment in their business. During maturity a simple year's dividend payout ratio may also be misleading, because earnings can fluctuate.

Like an emerging growth firm, a firm in a declining industry is typically a net cash user, but for different reasons. Instead of having an excess of attractive investment opportunities, the declining firm has difficulty maintaining its present business, as a consequence of their low profitability. Instead of returning substantial amounts of cash to investors for deployment in higher-return ventures, like a firm in a mature industry, a firm in a declining industry commonly struggles to preserve its dividend and borrow to remain viable.

Investigation of cash flow statement will not fully equip the analyst to predict whether a firm – whatever the stage of its development – will meet the challenges it faces. Thinking that about the types of problems a firm is likely to encounter at the particular point in its life cycle can, however, steer the analyst to characterize the firm's relative maturity, the cash flow statement can be an objective counterbalance to overly upbeat comments disseminated by management outside the financial statement proper.

5.4.4 Financial flexibility analysis applying free cash flow

Besides reflecting a firm's stage of developments and therefore the categories of risk it is most likely to face, **the cash flow statement provides essential information about a firm's financial flexibility, that is, the free cash flow.** By studying the statement, an analyst can make informed judgements on such questions as:

- How safe is the firm's dividend?
- Could the firm fund its needs internally if external sources of capital suddenly become scarce or prohibitively expensive?
- Would the firm able to continue meeting its obligation if its business turned down sharply?

Table 5.2

Analysis of financial flexibility

Firm Y

($ 000,000)

	2000
Basic cash flow	$ 17392
Less: increase in adjusted working capital	(1388)
Operating cash flow	16004
Less: capital expenditure	(8994)
Discretionary[21] cash flow	7010
Less: dividends	(6104)
Add: asset sales and other investing activities	1790
Cash flow before financing	2696
Add: increase in log-term	4132
Add: increase in notes payable	3534
Less: purchase of firm's common stock	(10904)
Less: miscellaneous	(22)
Decrease in cash and temporary investments	(564)

[21] Free cash flow and discretionary cash flow are used interchangeably.

Before analyzing the above table I would like to put in details the calculation of free cash flow. It is calculated Starting with **net income** and add back charges for **depreciation** and **amortization.** Make **an additional adjustment for changes in working capital**, which is done by subtracting current liabilities from current assets. Then subtract **capital expenditure, or spending on plants and equipment:**

Net income
+Depreciation/Amortization
- Change in Working Capital
- Capital Expenditure

Free Cash Flow

It might seem odd to add back depreciation/amortization since it accounts for capital spending. The reasoning behind the adjustment, however, is that free cash flow is meant to measure money being spent right now, not transactions that happened in the past. This makes FCF a useful instrument for identifying growing companies with high up-front costs, which may eat into earnings now but have the potential to pay off later.

Free cash flow represents the cash that is available for a company to spend after financing its capital projects. Free cash comes in particularly handy when sizing up companies in manufacturing and other capital-intensive industries, as it measures how well a firm can maintain or expand its productive capacity. It also gives a sense of a company's flexibility to pay down debt or buy back shares. On the flip side, a failure to generate healthy free cash flow sometimes indicates future liquidity problems.

I believe that. Table 5.2 will be simple to understand after grasping the preparation of free cash flow. Table 5.2 provides a condensed format that can help answer the above questions. At the top is the basic cash flow, it includes net earnings, depreciation, and deferred income taxes, less such items in net earnings not providing cash. The adjusted working capital does not include cash and notes payable.

The various uses of cash are deducted in order, from least to most discretionary. In difficult times, when a firm must cut back on various expenditures to conserve cash,

management faces many difficult choices. A key objective is to avoid damage to the firm's long-term health.

It can be observed that $ 1790 million provided by asset sales and other investing activities and the capital and dividend requirement is satisfied. The firm's decision also traceable that the cash flow before financing whish is $ 2696 million is used to repurchase common stock. The amount of common stock to be purchased is more than that so the firm made an arrangement of financing. This arrangement can be reduced from the cash flow of the firm. The stock buyback was financed by increasing long-term debt and notes payable. This situation of buying of common stock a discretionary expenditure that could have been eliminated without long-term harm to the firm.

The performance of the firm was excellent; it was achieved in the content of strong economy. If the business conditions do not allow the firm to have enough cash, repurchase stock pay its debt, the firm would have to consider various austerity measures for instance depressed economy. If it were in the depressing economy, those measures could be painful.

Most firms avoid the strategy not to pay out the dividend except that they face difficult circumstances. Even though the format in Table 5.2 makes the dividend decision look like a residual of other operating and capital expenditure choices, In some cases, maintaining the dividend cutting back on capital expenditures sacrifices long-rage competitiveness. On the other hand, a slowdown in demand may postpone the need for new capacity and make a cut in the capital budget. (Avoiding constructions of costly idle facility)

The firm's discretionary cash flow $7010 million covered its dividend of $ 6104 million by 1.15 times. For instance, earnings were to fall by $2000 million from its original $13614, while all other elements of discretionary cash flow remained constant. Discretionary cash flow would then fall to $1094 million below the indicated dividend level. If the firm did not happen to have asset sales in the works, it might be forced to borrow to pay its dividend.

To avoid the above conditions of cash-out, which is not prudence over prolonged period, the firm could reduce its capital expenditure; a cut of 12% of capital expenditure will keep discretionary cash flow to the level of dividend. Using reduction of 12% would not impair the firm's long-term competitiveness; an analyst could conclude that the firm had considerable flexibility to maintain its dividend in difficult times.

The main idea is that flexibility is partly a function of the likelihood of an earnings decline large enough to cause discretionary cash flow to fall below the indicated dividend level. At many times, a ratio of discretionary cash flow to dividend as low as the give4n firm's 1.15 times would be too small a cushion to suggest dividend continuity.

A final item in the analysis of financial flexibility is the change in adjusted working capital. In practice, increasing sales followed by increased inventories and generating high levels of account recievables. To the extent that this funds requirement cannot be met by expansions of accounts payable or other liabilities, a net use of funds occurred. In the given year, the adjusted working capital was $ 1388 million – a modest deduction from the firm's basic cash flow.

In the given format of cash flow it can be observed that the working capital is not including the notes payable as well as cash and short-term investments, unlike conventional working capital. The notes payable shows up as the part of the firm's financing for the year. The changes in cash and short-term investments are treated as a residual in the analysis flexibility.

Assume that the firm's increase is adjusted working capital represented a modest cash flow requirement brought about by healthy rise in sales. Some firms are able to fund needs of this type entirely by increasing account payable and other liabilities. Their balance sheets perennially show negative working capital, which does not indicate lack of liquidity, but rather high confidence on the part of their creditors.

Unfortunately, not every firm enjoys relative independence from their credit markets year in and year out. Sometimes a firm can face a sudden surge in sales, resulting in so large an increase in inventory and receivables that its operating cash flow turns negative, even though net income is rising. As long as its profits are healthy, a firm will not generally

have difficult in obtaining credit to the fund the shortfall. More problematic is the case in which a sudden drop-off in sales causes involuntary inventory accumulation. Until the firm sales its goods, it takes time and it cuts back on production, the raw material levels increase. When this cash drain is combined with an earning decline resulting from the sales drop-off, the financial squeeze can be acute. Most of the time, this condition of drop-off of sales can be the result of tight money condition.

The firm is in trouble, when credit is scarce, too expensive, or the firm has no chance to borrow. These conditions are caused by restrictive bank credit agreement, which may include limitations on total indebtedness. Beyond certain point, a firm cannot continue borrowing to meet its obligation. When the firm's financial squeeze becomes acute, management must cut back on discretionary expenditures to avoid loosing control. Unfortunately, many of the items that a firm can must reduce without disrupting operation in the short-run are outlays that are essential to its long-term health,. For instance, advertising and research are obvious targets, since they tend to have future benefits; the cash savings are apparent, while the cost to future revenue is not. This type of step gives way to transform a short-term problem to long-term one.

Despite the blessings that financial flexibility confers, however, maintaining a fund cushion is not universally regarded as a wise corporate policy. Jensen (1978) suggest that The opposing view is based of a definition of free cash flow as "cash flow in excess of the required to fund all of firm's projects that have positive net present values when discounted at the relevant cost of capital." A firm's management should pay, according to the argument, dividend all excess cash flow to the shareholders. The only alternative is to invest it in low-return projects (or possibly even low-return marketable securities), thereby preventing shareholders from earning their required on a portion of their capital. Left to their own devices, argue the proponents of this view, managers will trap cash in low-return investments because their compensations tend to be positively related to the growth of assets under their control. Therefore, pressure – including the threat of hostile takeover – should be exerted to force management to remit all excess cash.

The cash flow statement not only facilitates the analysis of a number of different types of firm facing different types of risks, it also helps to identify the categories into which firms fit. At all stage of development and whatever the nature of the challenges a firm

faces, financial flexibility – is best measured by studying the flow of funds – is essential to meeting those challenges. Financial flexibility is not merely a security blanket for squeamish investors, as it is sometimes portrayed. In the hands of aggressive but prudent management, it can be a weapon for gaining an advantage over competitors by maintaining long-term investment spending at times when other firms are forced to cut back.

6. Some problems in trade credit

It could be observed in today's Hungarian market economies that they initiate liquidation procedure, even though the firm has profit. In more cases, the cause is the shortage or insufficient of credit management. This event is not only the feature of Hungarian business entities, but also of every market economies.

The main aim of this topic is to call attention to the most important theory and practice concerning trade credit decisions and analysis, and to show the effects of trade credit on liquidity and cash flow of the firm using different models.

The main purpose of this discussion will be the decisions and analysis of account receivable of merchandise and manufacturing entities in granting or rejecting credit applicant on the base of the firm's liquidity.

Trade credit is the single most important sources of short-term external of finance. Rajan and Zingles (1993) report that account payables amounted to15% of the Assets for a sample of non-financial U.S firms on Global Vantage while debt in current liability accounted for just 7.1%.

In the case of many firms, the profit is high, but the cash equivalent (the result of operating cash flow, investment cash flow and financing cash flow) very low or negative. This situation will be disadvantageous from the point of demand of liquidity for the continuous operation in the business entities.

The analysis of this problem is necessary to know the practice and theory of credit management in question. This topic investigates all problems, which exit during granting credit for customers.

The main point of the examined problems is the following: any manufacturing or merchandise firm always wants to sell its products. The firm will be forced to sell its product on credit. If it does not accept to sell in credit, it can loose its potential customers.

But if it grants it products in credit, it takes some amount of risks when the customer does not pay at all. It is clear such a kind of sale terms needs a careful method of risk analysis.

A common explanation for trade credit is that suppliers have a monitoring advantage over banks. In the course of the business, suppliers obtain information about the buyer which other lenders can only obtain at a cost as argued by Schwartz and whitcomb (1978, 1979), Emery (1987), Freixas (1993), Biais and Gollier (1997), Jain (2001), among others.

The receivables form the part of operation cost of the firm. The extension of credit to customers is a cost of doing business. By keeping its money tied up in account receivable, the firm loses the time value of money and runs the risk of non-payment by customers. In turn for incurring these costs, the firm can be competitive, attract and retain customers, and maintain and improve sales and profits.

In general, firms those have strong capital position, they have their own experts of financial analyst, the one who plans and follows the formation of receivables with the help of credit policy. **The credit policy consists the term of sales, credit analysis and collection policy.**

The practice of the international firms' show that the ratio of debtors to total asset ranges 20% to 25% and for the average manufacturing, they account for about 37% of current assets during the operation period in many countries[22]. This represents a considerable investment of funds, and so the management of this asset can have a significant effect on the cash flow of the companies.

But the question is, does the firm have enough money from operation to continue in the following year? The answer may be no, because the firm does not have a good record for the collection of debts. If the debtors do not pay when it is due, the problem will raise. In order to analyze this problem, it will be given attention to credit and receivables, and to component of credit policies.

Credit management and policies have a close relation to inventory management. Credit management is a problem of bringing to balance the profitability and liquidity.

Credit terms provide sales attraction and the business entity allows longer time to customers to pay, the greater is the sales and the possible profits.

However, the longer the credit term the greater is the amount of account receivables and the greater the possible strain on the company's liquidity.

The credit sale relationship between customer and suppliers is a trust based on mutual need. The customer in general selects the supplier on the basis of its reputation as a source of quality at an acceptable price. The supplier accepts the order and extends the credit necessary to facilitate the sale if it believes the customer will honor the contract by paying the invoice according to the terms agreed. Both parties agree to a contract and are expected to live up to its terms.

The system works because both parties to every transaction do the necessary pre-transaction investigation and are prepared to contract quality of the seller's product is evaluated by the buyer according to criterion that the buyer seems important. This information can usually be gathered through associations with other buyers and trade associations. In the same way, credit managers gather information about customers. The sources of information will be discussed under credit analysis.

The credit manager has the responsibility to assess the financial situation of the firm using different methods and analyzing procedures to achieve the target of the business entity.

Generally, the firm's financial manager has to analyze and decide to which customer to grant credit or no. In order to analyze and decide, he has to plan and control account receivable through the establishment of credit policy, which includes determining the terms of sales, credit analysis, and collection policy. To do planning and controlling is needed the necessary information about the customers using statistical methods and necessary models in order to manage the credits given or to be given to customers.

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[22] Weston J.F., Copland T.E. *Managerial finance*, Second edition., UK, 1988

6.1 Credit and receivables

Rajan and Petersen (1997) explained that when we view the firm as a supplier, its account receivables are a proxy for how much it lends its customers. When we view the firm as a customer, its account payable are its borrowing from its supplier. A firm's account receivables are simultaneously determined by the firm's willingness and ability to extend credit, as well as the ability or desire of its customers to repay the amount when due.

When a firm sells goods and services it can demand cash on or before the delivery date or it can extend credit to customers and allow some delay in payments. Granting credit is making an investment in a customer; an investment tied to the sale of a products or services. The granting credit will be determined by the firms' credit policy.

Investing in account receivable requires consideration of several interrelated aspect: investment costs, losses form bad debts, the impact of credit terms on sales, and the related cash flows, for instance for inventory purchases.

The important decision variables are credit policy variables and collection policy variables.

- Credit policy variables consist cash discount period and credit period.
- Collection variables contain the seller's collection expense as a percentage of overdue accounts, the penalty rate charged on over due accounts, and the time when accounts are sold to a collection agency.

The credit policy affects directly total credit sales and the proportion of early payments and indirectly affects the proportion overdue payments. Cash discounts offer substantial financial advantages to buyers.

Meltzer (1960), Schwartz and Whitcomb (1979), Brennan, Maklcsimovic and Zechner (1988), and Mian and Smith (1992) suggested that trade credit may be offered even if the supplier does not have a financing advantage over financial institutions because credit

may be used to price discriminate. Since credit terms are usually invariant to the credit quality of the buyer. Trade credit reduces the effective price to low-quality borrowers[23]. If this is the most price elastic segment of the market, then trade credit is an effective means of price discrimination. A natural reason why this segment's demand may be more elastic is because it is typically credit rationed. If so, trade credit both lowers the effective price of the good and permits this segment to express its demand.

Another way of seeing this is to note that firms with a high margin (between sales and variable costs) for their product clearly have a strong incentive to make additional sales, but without cutting the price to existing customers. Since their profit on the net unit is higher, they would be willing to incur a positive cost to sell an additional unit, so long as it does not affect their previous sells. Under the assumption that antitrust laws prevent direct price discrimination, high-priced trade credit may be a subsidy targeted at risky customers. Credit worthy customers will find the trade credit overpriced and repay is as soon as possible. On the other hand, risky customers will find it a worthwhile to borrow because trade credit may still be cheaper than the other sources they have access to.

The buyer's major decision is whether or not to take the discount or whether to delay payments beyond the due date, which is called stretching payables. If payables are not to be stretched, the economically correct decision for the buyer is to pay the invoice on the last date of the discount or the last day to the credit period. If the buying firm can earn interest from its demand deposits at the bank or can invest the resources in a money market account, it should never pay before the final credit period.

The costs associated with granting credit are not trivial. First, there is the chance that the customer will not pay. Second, the firm has to bear the costs of carrying the receivable. The credit policy decision thus involves a trade-off because the benefit of increased sales and the cost of granting credit.

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[23] Of course, if there are multiple creditors including financial institutions, bankruptcy laws may prevent a creditor from seizing particular goods unless the sale is on consignment in which case this advantage may be irrelevant.

If a firm decides to grant credit to its customers, then it must establish procedure for extending credit and collecting. The firm has to take in consideration the following components of credit policy:

- Terms of sale
- Credit analysis.
- Collection policy.

There are several events that occur during account receivable period. These events are the flow of money associated with granting credit, and they can be illustrated with a process of granting credit diagram.

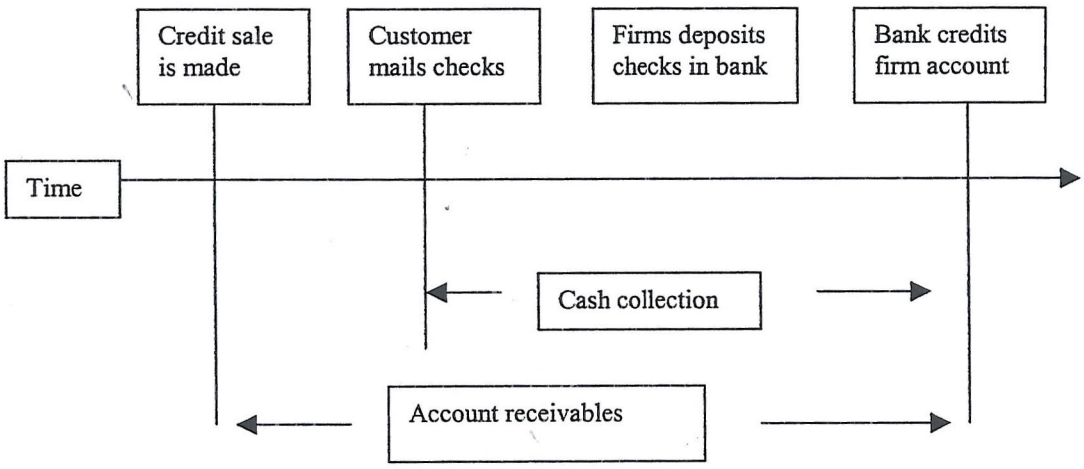

Figure 6.1

The process of granting credit

One way to reduce the receivable period is to speed up the *checking mail*, *processing* and *clearing*. It is apparent that one of the factors influencing the receivable period is ***float.***

6.2 Terms of the sale

Terms of the sale establish how the firm proposes to sell its goods and services. A basic decision is whether the firm will require cash or will extend credit. If the firm does grant credit to customer, the terms of sale will specify the following distinct elements:

- The period for which credit is granted (credit period)
- The cash discount and the discount period
- The type of credit instrument

Smith (1987) showed that Credit terms typically quote a discount date, a due date, as well as the amount of discount for payment by the discount date. For example, firms in business quote trade credit terms as 2/10, net 30[24].

The **credit period** is the basic length of time for which credit is granted. It is almost always between 30 and 120 days. If a cash discount is offered, then the credit period has two components: *the net credit period* and *the cash discount period.*

The easiest way to understand the terms of sale are to consider the terms of 2/10, net 30 are common[25]. This means that customers received a 2% discount if their bill is paid with in ten days (the discount date) or the may pay the full amount by 30 (the due date). These terms imply an escalating schedule of penalties. The customer gets what is effectively an interest free loan until the tenth day. If the customer does not pay by the discount date, but pays on day 30, it is effectively borrowing over the next 20 days at annual rate of 43.5%. If does not pay by the due date. Additional sanctions may be applied such as the eventual cutoff of supplies. These sanctions could raise the effective interest rate even higher. The derivation of the effective interest rate could be reached at Equation 6.1 to 6.4.

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[24] This kind of term of sales may not be used in Hungary; but it is applied in many countries.

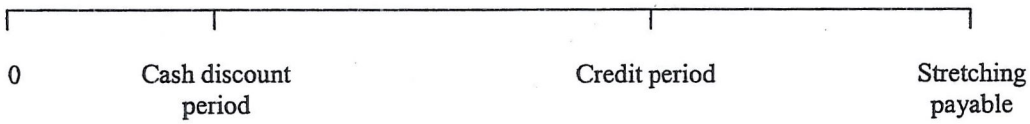
[25] Theodore N. Beckman: *Credits and Collection*: *Management and Theory*, New York,: McGrow-Hill,1962

The beginning of credit period depends on the contractors' agreement.

- The *invoice date* could be the beginning of the credit period.
- The terms of sale might be *receipt of goods* (**ROG**).
- The beginning of credit period could be *end-of- month* (**EOM**).

Figure 6.2

The sequence of payments



The credit instrument is the basic evidence of indebtedness. Most trade credit is offered *on open account*. This means that the only formal instrument of the credit is the invoice, which is sent with the shipment of goods and which the customer signs as evidence that the goods have been received, afterwards, the firm and its customers record the exchange on their hooks of account.

The problem of determining credit period: according to the normal approach, it is clear that if the credit period too long and too short it will be disadvantageous to seller and buyer respectively. The credit policy of the firm is the important phase in determining the optimal of credit period.

One of the most important points in determining the credit period is the buyer's operating cycle.

The operating cycle has two components: The inventory period and receivable period.

- The buyer's inventory period is the time it takes the buyer to acquire inventory, process it, and sell it.
- The buyer's receivable period is the time it then takes the buyer to collect on sale,

If the firm's credit period is longer than buyer's inventory period, then the firms finances a portion of buyer's operating cycle and thereby shorten the buyer's cash cycle. If seller's credit period exceeds the buyer's inventory period, then it is not only financing part of the buyer's inventory purchases, but part of the buyer's receivable as well.

Furthermore, if seller's credit period exceeds the buyer's operating cycle, then the seller is effectively providing financing for aspects its customer's business beyond the immediate purchase and sale of its merchandise. The reason is that the buyer effectively has a loan from firm even after the merchandise is resold, and the buyer can use that credit for other purposes. For this reason, the length of the buyer's operating cycle should be cited as an appropriate upper limit to the credit period.

The shortening of credit period will decrease the tension of the buyers to buy from the firm. Therefore, when the credit period comes to be the same with the customers operating cycle, let us consider the situation as optimum.

There are a number of other factors that influence the credit period. Many of these also influence our customer's operating cycle; so once again, these are related subjects. Among the most important are:

- Perishable and collateral value,
- Consumer demand,
- Cost, profitability and standardization,
- Credit risk,
- The size of the account,
- Competition,
- Customer type.

The costs of credit: as it has been discussed, **cash discounts** are often part of the terms of sale.

- One reason discounts are offered is *to speed up the collection of receivables*,
- Another reason for cash discount is that they are a way of *charging higher prices* to customers that have had credit extended to them.

When the firm offers cash discount to the customer, the customer will be in the position to decide. That is, he has to decide to accept the offer or no, or he has to wait up to the end of credit period. He has to evaluate the two decision alternatives with the help of ***annual implicit cost rate.*** The annual implicit cost rate could be applied to repeated and non-repeated customers.

In case of repeated customers: first let's see when the firm offers credit to its repeated customers. So the determining of annual implicit cost rate will be as following. Let P_c be the price of the goods taken in credit and P_d is the price of goods if the customer accepts the cash discount, and i is the interest rate as well as n the number of days for credit period.

$$P_c = P_d(1+i)^{\frac{n}{360}} . \qquad (6.1)$$

It can be seen from the equation (6.1) in the repeated customers financial relation with credit is considered as compound interest and the cash discount period is not taken in consideration, but the credit period[26].

It can be reduced that the annual implicit cost rate (AIC) from the above equation as following:

$$AIC = \left(\frac{P_c}{P_d}\right)^{\frac{360}{n}} - 1 \qquad (6.2)$$

where d is the cash discount rate, that is, $P_d = P_c(1-d)$, then we will have the following equation:

$$\text{AIC} = \left(\frac{1}{1-\text{d}}\right)^{\frac{360}{n}} - 1, \qquad (6.3)$$

here the annual percentage rate is compound interest as if the customer takes credit up to the end of credit period. If the annual percentage rate is very high the customer has to

[26] Suppliers never ask interest rate as financial institutions from creditors, but give discounts. The discount rate can be calculated by creditors if they pay on the discount period for the adjustment of their cost of goods sold.

take credit from other financial sources with lower interest rate or he has to accept the cash discount.

In the case of non-repeated customers: when a transaction is a single-event basis, a simple interest equivalent is more appropriate:

$$AIC = \left(\frac{d}{1-d}\right)\left(\frac{360}{n}\right) \qquad (6.4)$$

Failure to take the discount is equivalent to borrowing the amount of the payable for the credit period at annual implicit cost on single event basis.

In the case of stretching payables: when payments are delayed beyond the credit period the credit manager should think about one or more of the following reasons might be the cause:

- payments has been simply overlooked,
- the debtor is having financial problems,
- the discount is not an attractive enough incentive to induce early payments.

The first two possibilities are properly part of the credit review and granting function of the credit department. However, if the discount is not enticing enough, the credit manager should attempt to understand why this is the case, as the part of this analysis, it is useful to analyze why customers stretch payables.

The critical questions the debtor must ask when paying invoices are:

- Should payables stretched?
- If payables are stretched, for how long should they be?

The factors to consider are the loss of credit standing and reputation against the value of using the stretch funds. These considerations require quantification of loss of credit standing and reputation, which is obviously a difficult task. Stretching of a short period of time is less damaging to the firm than stretching for a long period; the firm the payable is owed to also affect the cost of stretching. Factors such as a seller's size and its relative

financial strength, the goodwill between the two companies, and alternative sources of supply influence the credit and reputation loss function.

In the case of stretching payable the compound interest and simple interest can be applied for the repeated customers and non-repeated customers respectively.

If the cash discount, discount period and credit period are increased the sales volume will increase. The firm gains sales from competitors and from new customers to the market since increasing these credit variables effectively lowers the market price. The increased discount amount results in the buyer remitting a smaller amount. Lengthening the discount period and the credit period means that the present value of the amount due is now less.

6.3 Analyzing credit policy

Extending credit to customers often involves a trade-off between holding inventory and account receivables. The credit decision should be taken only after the credit manager has considered completely all aspects of granting credit and the way this decision integrates with other decisions and policy of the firm.

The decisions may consist of the following factors:

- the amount of money to be invested in credit,
- the type of credit terms,
- the type recipient of the credit,
- monitoring the receivables,
- structuring the collection process.

These factors must be evaluated in conjunction with other corporate policies. If *scarce funds* are used for credit extension, then fewer investable funds are available for both *long-term purposes* (investment in fixed assets) and *short-term assets* (investment in inventory). Of course, most firms help finance the extension of credit by using trade-

credit themselves. As a major component of the ***cash conversion cycle***, trade-credit is a significant tool for management to use in maximizing the use of its resources.

The goal of credit decision is to maximize shareholders wealth. Unfortunately, all too often the decision to extend is a passive one. Too little consideration is given to the effect of credit extension on the firm's revenue and cost structures.

In evaluating credit policy, there are five factors to consider:

1. ***Revenue effect.*** If the firm grants credit, then there will be a delay in revenue collections at some customers take advantage of the credit offered and pay later. However, the firm may be able to charge a higher price if it grants a credit and it may be able to increase the quantity sold.
2. ***Cost effect.*** Although the firm may experience delayed revenue if it grants credit, it will still incur the cost of sales immediately, whether the firm sells for cash or credit, it will still have to acquire or to produce the merchandise and pay for it.
3. ***The cost of debt.*** When the firm grants credit, it must arrange to finance the resulting receivables. As a result, the firm's cost of short -term borrowing is a factor in the decision to grant credit.[27]
4. ***The probability of nonpayment.*** If the firm grants credit, some percentage of the credit buyers will not pay. This can't happen, if the firm sells for cash.
5. ***The cash discount.*** When the firm offers a cash discount as part of its credit terms, some customers will choose to pay early to take advantage of the discount.

It will be illustrated how to evaluate the benefits and costs when there are changes in credit policies using the following assumptions. Let a manufacturing firm was selling on cash, but one of the major customers applies for credit. His request was if the firm allows him to pay after one month, he will buy 10% more than the existing amount with 2% monthly rate of return.

The firm is in the decision position to accept or reject the request. In order to decide it to evaluate the request from its customer to change its current policy to near one month (30 days) or no.

To analyze this proposal, the followings are required:

P= unit price

V = unit variable cost

Q = monthly quantity sale

Q^* = under the new policy quantity sold

R = Monthly required return

It is not taken into account the discounts and the possibility of default here. Taxes are also ignored, because they do not affect the final conclusions.

If the firm does change to net 30 days on sale, then the quantity sold will rise to Q^*. Monthly income will increase to $P \times Q^*$, and costs will be $V \times Q^*$. The present value of future incremental profit is thus:

$$PV = [(P - v)(Q^* - Q)] \tag{6.5}$$

Now it can be known the benefit of changing the policy from the above equation, the next question will be what is the cost? There are two components to consider. First, the quantity sold will rise for Q to Q^*. The firm will have to produce (Q^*-Q) more units at cost of $V \times (Q^*-Q)$. Secondly, the sales that would have been collected this month under the current policy $(P \times Q)$ will not be collected. Under new policy, the sales made this month will not be collected until 30 days later. The cost of the changing is the sum of these two components:

$$\text{Cost of granting credit} = PQ + v \times (Q^*-Q) \tag{6.6}$$

The NPV of granting credit according to the relations discussed:

$$NPV = -[PQ + v(Q^* - Q)] + [(P - v)(Q^* - Q)]/R \tag{6.7}$$

Therefore, the change is very profitable. Based on discussion so far, the key variable for the firm is (Q^*-Q), the increase in unit sales. The projected increase per unit is only an estimate, so there is some forecasting risk.

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[27] The required rate on investment depends on the risk of investment, but not on the sources of finance.

$$Q^* - Q = \frac{(PQ)R}{(P-V)-(R-V)} \qquad (6.8)$$

Under these circumstances, it's natural to wonder what increase in unit sale is necessary to break even. It can be calculated the break-even point from equation (6.7) by setting the $NPV = 0$ and solving for (Q*- Q):

This tells us that the change is a good idea as long as the firm is confident that it can sell at least (Q*- Q) more units per month.

6.3.1 Optimal credit policy

It has been discussed how to compute NPV for changing in credit policy, but it has not been discussed the optimal amount of credit or the optimal credit policy. In principle, the optimal amount of credit is determined by the point at which the incremental revenues from increased sales are exactly equal to the incremental costs of carrying the increase in investment in account receivables.

A carrying cost is the cost, which results because of granting credit. Its amount depends on the size of credit offered. The carrying costs associated with granting credit come in three forms:

- The required return on receivables,
- The losses form bad debts,
- The cost of managing credit and credit collections.

The third cost, the cost of managing credit, is the expenses associated with running the credit department. These three costs depend on the type of firms' policy whether to increase or decrease their amount. If the firm follows flexible credit policy these costs attempt to increase.

If a firm continues to deal with a very aggressive credit policy, then all of the associated costs will be low. As the result, it will have a shortage of credit, so there will be an opportunity cost. This foregone benefit comes form two sources, the increase in quantity sold, (Q*-Q), and potentially a higher price. As a firm applies relaxed credit policy, the opportunity costs go down.

There is a point where the total credit cost is minimized in Figure 6.3. This point corresponds to the *optimal investment* in receivables. If the firm extends more credit than this minimum (D*), the additional Profit form new customers will not cover the carrying cost of the investment in receivables.

In general, the costs and benefits for extending credit will depend on characteristics of particular firms and industries. For example, it is likely that the firms with excess capacity, low variable operating costs and repeat customers will extend credit more liberally, than other firms.

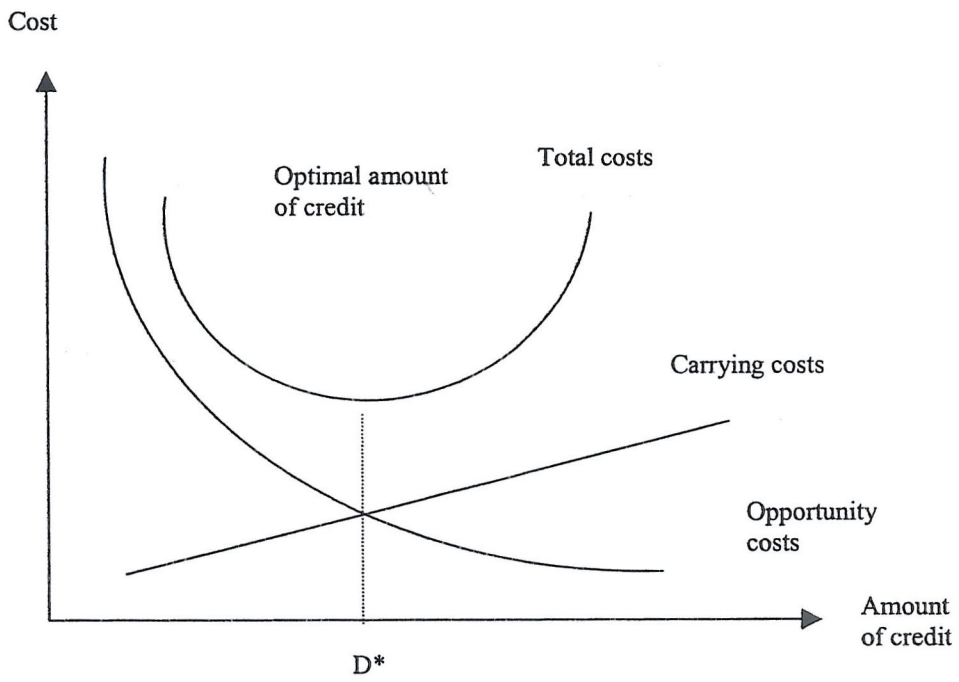

Figure 6.3

The costs of granting credit

Firms that grant credit have the expense of running a credit department. In practice, firms often choose to contract out all or part of the credit function to a factor, an insurance firm

or captive finance companies. Factoring is an arrangement in which the firm sells its receivables. Depending on the specific arrangement, the factor may have full responsibility for credit checking, authorization, and collection. Smaller firms may find such an arrangement cheaper than running a credit department.

Firms that manage internal credit operations are self-insured against default. An alternative is to buy insurance through an insurance firm. The insurance firms offer coverage up to a pre-set money limits for accounts. As you would expect, accounts with higher credit rating merit higher insurance limits, This type of insurance is particularly important to exporters, and government insurance is available for certain types of export. Large firms often extend credit through captive finance companies, which is simply a wholly owned subsidiary that handles the credit function for the parent firm. General Motors Acceptance Corporation (GMAC) is a well- known example. General Motors sells to car dealers who in turn sell to customers. GMAC finances the dealer's inventory of cars and also customers who buy the cars.

A firm would choose to set up a separate firm to handle the credit function because there are a number of reasons but primarily one is to separate the production and financing of the firm's products for purposes of management financing and reporting. For example, the finance subsidiary is able to borrow in its own name, using its receivable as collateral and subsidiary often carries a better credit rating than the parent. This may allow the firm to achieve an overall cost of debt that is lower than could be obtained if production and financing operations were commingled.

6.4 Credit analysis

Once a firm decides to grant credit to its customers, it must then establish guidelines for determining who will and will not be allowed to buy on credit. It usually involves two steps: Gathering relevant information and determining creditworthiness.

If a firm does want credit information on customers, there are a number of sources used to assess creditworthiness including the followings:

- financial statement,
- credit reports on the customer's payments history with other firms,
- banks,
- The customer's payments history with the firm.

Collection of information is costly and time consuming. It is to the firm's benefit to expedite the decision process as much as possible. This decision process should continue until MC=MR.

6.4.1 Credit evaluation and scoring

There are no magic formulas for assessing the probability that a customer will not pay. In very general terms, to evaluate the credit risk, credit managers should consider the five Cs of credit

1. ***Character***: The customer's willingness to meet credit obligations
2. ***Capacity***: The customer's ability to meet credit obligations out of operating cash flows
3. ***Capital***: The customer's financial reserves
4. ***Collateral***: An asset pledged in the case of default
5. ***Conditions***: General economic conditions in the customer's time of business.

The partial evaluations of 5C's are the followings[28]:

Character	Average past payments	On time	Up to 30 days late	Up to 60 days late	Scores
Capacity	Profit margin	0%-5%	6%-12%	13%-20%	
	Quick ratio	<1	1-2	>2	
	Cash flow	low	average	high	
Capital	Current ratio	<2.0	2-3	>3	
	Debt to equity ratio	<1.0	1-2	>2	
	Interest earned	<2×	2×-3×	>3×	
Collateral	Net worth	Low	Average	High	
	Percent assets free	Low	Average	High	
	Market value of net worth	Low	Average	High	
Conditions	Recession		Average	Prosperity	
				Total scores	xxx

Source Liquidity Analysis and Management

Credit scoring is the process of calculating a numerical rating for a customer based on information collected, credit is granted or refused based on the result. A firm might rate a customer on the scale of poor, medium and good on each of the five Cs of credit using all the information available about the customer.

The five Cs represents a judgment of risk based on the following factors:

- The customer will pay on time is more probable.
- The customer is living or no within the credit line.
- Evaluating the financial performance of the customer.

[28] The points should be assigned between 0 and 15. The higher the points assigned the more favorable is the evaluation.

Conditions:

- *A higher degree of subjective judgment is required.*
- *Many of the items are divided among low, average and high.*
- *Who or what distinguishes among these categories?*
- *The total score can range from 0 to 165.*
- *What constitutes an acceptable score for credit extension?*

These conditions lead us by their own that each firm has its own application criteria for the system. The decision of granting credit on assigning the score depends on the credit mangers, which of the items are relatively more important variables, and to what degree. The applicant's total points are determined and then compared with a predetermined, overall, minimum acceptable value. If the credit manger prepares the system carefully and has properly evaluated the data supplied by the applicant, then should have a reasonable expectation of success.

The importance of the ***five Cs*** is that they cause the credit manager to consider the overall financial and operational circumstances of both the credit granting and the applicant seeking credit.

While the scoring method is used attention should be taken that its result are not influenced by the data input. When the total assets are not changed, the current ratio could be manipulated to reach at the desired current ratio. The important task of the credit manager is to examine whether the ratio is window dressing or no.

6.4.2 Simple NPV model

When the firm wants to grant credit, it has to classify the customers into non-repeated and repeated customers. To understand better the problems, it will be taken into consideration on the already investigated illustration. As the result, it is attempted to show the most important technical element of credit analysis.

In the case of non-repeated customer: a new customer wishes to buy one unit on credit at a price of P per unit. If credit is refused, then the customer will not make the purchase. If credit is granted, then, in one month, the customer will either pay up or default. The non-payments probability is π. In this case, the probability (1-π) can be interpreted the new customer will pay. The business does not have repeat customers so this is strictly about a non-repeated customer. We assume that the required return on receivables is R per month and the variable cost is V per unit.

If the firm refuses credit, then the incremental profit is zero. If it grants credit, then it spends V this month and expects to collect $(1-\pi)P$ next month.

The present value of granting credit is:

$$NPV = -V + \frac{(1-\pi)}{(1+R)}P \qquad (6.9)$$

Therefore, if the NPV (π) is greater or equal to zero, credit should be granted. It should be noticed that $(1+R)$ divides it instead of by R because it assumed that this is a one-time transaction.

An important point when firm grants credit to new customer is a firm risks its variable costs (V). It stands to gain the full price (P). For a new customer, then, credit may be granted if the default probability is high. The break-even probability can be determined from equation (6.9) by setting the NPV equal to zero and solving for π.
The break-even probability (NPV (π) =0),

$$\pi = 1 - V\frac{(1+R)}{P} \qquad (6.10)$$

The firm extends credit as long as there is a $(1-\pi)$ chance or better of collecting. This explains why firms with ***higher markups*** will tend to have loosened credit terms.

It is considered that the NPV (π) is a decreasing linear function of π, from the seller point of view, in the case of new customer the probability that the customer will not pay, is

acceptable default probability. If an old, cash paying customer wanted to switch to credit basis, the analysis would be different, and the maximum acceptable default probability would be much lower. The important difference is that if credit is extended to an old customer, then the seller risks the total sales price (P), because this is what it collects if it does not extend credit. If the firm extends credit to a new customer, it only risks its variable costs.

In the case of repeat customers: the exiting customer wants to get goods on credit at a price of P per unit. If the firm grants credit, it spends V this month, next month either this gets nothing, if the customer defaults, or it gets P, if the customer pays. If the customer does pay, then the customer will buy another unit credit and the firms will spend V again. The profit for the month is thus P-V. In any subsequent month, this same P-V will occur as customer pays for the previous month's order and places a new one. It is assumed that the rate of return of monthly account receivables is R, and the unit variable cost is V.

It follows form the above discussion that, in one month, the firm will receive nothing with probability π. With probability $(1-\pi)$, however, the firm will have a permanent new customer. The value of a new customer is equal to the present value of $(P-V)$ every month forever.

$$PV = (P\text{-}V)/R \tag{6.11}$$

The net NPV of extending credit is therefore:

$$NPV(\pi) = -V + \frac{(1-\pi)(P-V)}{R} \tag{6.12}$$

The break-even probability ($NPV(\pi) = 0$),

$$\pi = -V\frac{R}{P-V} + 1 \tag{6.13}$$

The firm should extend credit unless default is virtual certainty. The reason is that it only costs $(P-v)/R$ to find out who is a good customer and who is not. A good customer is worth $(P-v)/R$ amount of money, however, the firm can afford quite a few defaults.

Repeat business will often turn out that the best way to do credit analysis is simply to extend credit to almost anyone. It also points out that the possibility of repeat business is a crucial consideration. As the result, the important thing is to control the amount of credit initially offered to any one customer so that the possible loss is limited.

6.4.3 Linear Discriminant model

The evaluation and decision of credit request need strict examination, because the firm takes risk for granting credit.

The manager of credit department has to compare the past financial data of the customers in the sense that they were capable to fulfil their credit agreement or no over time, then like applicants in the future can be expected to behave in a similar way. This can be done from the financial statements of the existing customers. He can access to the current ratio (C), and debt-to-equity ratio (D) in order to analyze and decide to grant credit or no. Another important financial ratio can also be used for the required analysis.

Assume that the credit manager follows the current ratio, C, and the debt-to-equity ratio, D, of the applicant are important for assessing credit risk, they have not to be contaminated by window dressing. He has to differentiate from these ratios that they were good and bad customers.

The discriminant analysis helps the credit manager to grant credit for new customers or no.

$$Z = b_1(C) + b_2(D) \qquad (6.14)$$

According to the assumption given above, it can be determined the linear combination of the observed variables with the help of discriminant analysis. A $Z = Z(C, D)$ linear function is called discriminant function, which it can be determined between the groups and within the groups by maximization the quotient of the standard error.

The unknown parameter of discriminant function (b_1, b_2) can be reduced as the followings: assume that there are n observed (C_i, D_i) variables, where there are s units of good customers and t units of bad customers. It is recorded the classification using upper index.

(C_i^J, D_i^j), i = 1,...,s and (C_i^r, D_i^r), i = 1,...,t. (6.15)

In order to use the linear discriminant function for empirical analysis, it must be estimated the coefficient of equation (6.14). So it should be led some simple remarks for simplification.

$$\left(C_i^j, D_i^j\right), i=1,\ldots,s \quad \text{és} \quad \left(C_i^r, D_i^r\right), i=1,\ldots,t.$$

$$\overline{C}^j = a, \quad \overline{D}^j = b, \quad \overline{C}^r = f, \overline{D}^r = g,$$

$$\sum_{i=1}^{s}\left(C_i^j - \overline{C}^j\right)^2 = c, \sum_{i=1}^{t}\left(D_i^j - \overline{D}^j\right)^2 = d,$$

$$\sum_{i=1}^{s}\left(C_i^r - \overline{C}^r\right)^2 = h, \quad \sum_{i=1}^{t}\left(D_i^r - \overline{D}^r\right)^2 = i,$$

$$\sum_{i=1}^{s}\left(C_i^j - \overline{C}^j\right)\left(D_i^j - \overline{D}^j\right) = e, \quad \sum_{i=1}^{t}\left(C_i^r - \overline{C}^r\right)\left(D_i^r - \overline{D}^r\right) = j.$$

Then the following steps help to solve b_1 and b_2,

$$b_1 = \frac{(a-f)(d+i)-(b-g)(e+j)}{(c+h)(d+i)-(e+j)^2} \qquad (6.16),$$

$$b_2 = \frac{(b-g)(c+h)-(a-f)(e+j)}{(c+h)(d+i)-(e+j)^2} \qquad (6.17).$$

The credit manager can decide to grant credit to the credit applicant depending on Z indicator, but he has to calculate the Z value for good and bad groups. The value of good groups will show higher value and the value of bad groups will be lower results. Assume

that Z_1 is the maximum value of bad groups, and Z_2 is the minimum value of good groups. Theoretically, $Z_1 > Z_2$ is not excluded. This shows us that the financial manager did mistake in the previous grouping, his principle of grouping was inconsistency. Therefore, according to the principle of strictness the grouping must be done again.

In reality, a $Z_1 < Z_2$ and we give Z' is the Z value of new credit applicant.

i. If $Z' \leq Z_1$, then the credit applicant will be denied,

ii. If $Z' \geq Z_2$, then the credit applicant will be accepted,

iii. If $Z_1 < Z' < Z_2$, the credit manager has to analyze in another point of view such as the applicant has never been delinquent or always paying. In this situation needs further analysis about the customer.

Let's consider the following example:

The Y firm experienced substantial increases in delinquent accounts. In an attempt to correct this problem, the credit manager decided to develop a linear discriminant model to evaluate potential credit customers. After sampling past records of customers, the credit manager decided to develop a model that used cash flow as a percentage of sales (C), and inventory turnover (T) as discriminant variables. The following table identifies successful and delinquent customers based on these two ratios:

Successful			Delinquent		
Customers	C_i	T_i	Customers	C_i	T_i
1	0.27	15.4	1	0.10	2.7
2	0.19	9.6	2	0.12	5.1
3	0.34	12.9	3	0.30	4.0
4	0.42	10.4	4	0.06	3.7
5	0.20	21.2			
6	0.36	14.7			
7	0.14	8.4			

Determine the linear discriminant function from the above data, and determine the upper and lower limit of the successful and delinquent customers.

Customers	C	T	$(C-\overline{C})^2$	$(T-\overline{T})^2$	$(C-\overline{C})(T-\overline{T})$
1	0.27	15.4	0.000016	4.7175	-0.0087
2	0.19	9.6	0.007056	13.1624	0.3047
3	0.34	12.9	0.004356	0.1076	-0.0216
4	0.42	10.4	0.021316	7.9975	-0.4129
5	0.20	21.2	0.005476	63.5529	-0.5899
6	0.36	14.7	0.007396	21.6678	0.4003
7	0.14	8.4	0.017956	23.3095	0.6469
$\sum$	1.92	92.6	0.063572	134.5152	0.3188
μ	0.274	13.228			
	(a)	(b)	(c)	(d)	(e)

Customers	C	T	$(C-\overline{C})^2$	$(T-\overline{T})^2$	$(C-\overline{C})(T-\overline{T})$
1	0.10	2.7	00020	1.3806	0.0529
2	0.12	5.1	0.0006	1.5006	-0.0306
3	0.30	4.0	0.0240	0.0156	0.1937
4	0.06	3.7	0.0072	0.0306	0.0149
$\sum$	0.58	15.5	0.0338	2.9274	0.2615
μ	0.145	3.875			
	(f)	(g)	(h)	(i)	(j)

$$b_1 = \frac{(a-f)(d+i)-(b-g)(e+j)}{(c+h)(d+i)-(e+j)^2} = 0.9427$$

$$b_2 = \frac{(b-g)(c+h)-(a-f)(e+j)}{(c+h)(d+i)-(e+j)^2} = 0.0641$$

Results for Z-score for existing customers

1	1.2417	1	0.2673
2	0.7945	2	0.4400
3	1.1474	3	0.5992
4	1.0626	4	0.2937
5	1.5475		
6	1.2816		
7	0.6704		

Following this the model can be used to accept or deny credit applications originating from our customers $Z=0.9427C+0.0641T$. The ranking ranges from the lower (0.6704) to the higher result (1.5475). Any credit applicant that has reached the lowest (0.6704) result of the successful customers, or higher than this, will be accepted. In this case the highest result of delinquent customers is 0. 2673, so any applicant whose Z-scores is reached the highest delinquent score and below will be denied on granting credit. If any credit applicant's score is between 0.2674 and 0.6703, then the credit application should be further investigated before the credit manager has to decide.

The point is that this system offers better approach to credit evaluation than does the simple five Cs' point system, because it begins with the wish to statistically categorize two or more groups of cases, such as good or bad credit risks or solvent or insolvent. The mathematical objective of discriminant analysis is to weigh and linearly combine the discriminating variables in some fashion so that the groups are forced to be statistically distinct as possible.

6.4.4 The NPV without inflation

A generalized NPV formation of a credit model in a non- inflationary environment is

$$NPV = \sum_{t=0}^{m} \frac{-I_t + F_t(1-T)}{(1+r)^t} \geq 0 \qquad (6.18)$$

I_t: incremental investment in time period t as a result of credit decision

F_t: marginal net cash flow occurring at time period t.

T: marginal corporate tax

r: appropriate risk-adjusted discount rate

m: number of periods policy is expected to remain in effect.

The decision rule is to accept the credit policy if the *NPV* is greater than or equal to zero, in other words, MR ≥ MC. If two mutually exclusive credit policies are compared the decision is to accept the policy with the higher NPV.

If the investments are only made at $t=0$ and those cash flows are constant (F_t =F for every t), Equation (6.18) becomes:

$$NPV = -I_0 + \frac{F(1-T)}{r} \geq 0, \qquad (6.19)$$

Multiplying both sides of equation (6.19) by r results in the residual income model (RI).

$$RI = r(NPV) = F(1-T) - rI_0 \qquad (6.20)$$

The $F\ (1\text{-}T)$ is earning after tax and the rI_0 is adjustment for the opportunity cost of fund invested.

The new credit policy to be accepted by the decision-makers is when the RI ≥0.

To make simple the thought of the following parts the cash flow from equation (6.20) is,

$$F = R_n(1-V)-C-f$$

R_n: new incremental gross revenue

V: incremental variable cost ratio

C: incremental amount of cash discount taken

f: any incremental fixed costs and bad debts incurred.

The relationship with equation (6.20) will be

$$RI = [R_n(1-V)-C-f](1-T)-rI_0 \geq 0, \qquad (6.21)$$

The most important point is here how to evaluate the incremental investment I_0 under the change of credit policies. Fore instance, the lengthening of credit period follows by increasing sales. The increasing sales create large amount of receivable balances because the present customers pay when the longer credit period is due. The longer credit period will be the function of attracting new customers. This type of credit may give rise to invest on inventories to stimulate on sales. The investments in assets also increase in spontaneous liabilities, such as account payable and accrued wages.

In this case the incremental investment is

$$I_0 = ACP_o \times ADS_o + V \times ACP_n \times ADS_n + I - L \qquad (6.22)$$

The average collection period (ACP_o) and average daily sales (ADS_o) increased investment in receivables associated with original sales. The increase in receivable investment associated with new sales is shown by $V \times ACP_n \times ADS_n$ (average daily sales), increased investment in inventories (I), and increased spontaneous liabilities (L). The increased investment in account receivable for original sales $[ACP_o \times ADS_o]$ includes the full amount of those receivables, that is, both inventory cost and profit[29] in the (6.22) equation. However, the investment in receivables from new sales in the equation (6.22)

[29] It is assumed the old customers are affected by the changing credit terms.

$[V \times ACP_n \times ADS_n]$ excludes all profit margins. The difference is that the only variable costs are invested in new receivables, where as there is an opportunity cost associated with the existing outstanding receivables that are stated at cost plus profit (selling price) will be collected at the normal average collection period. The ***average collection period*** **(ACP)** for the old accounts changes as a result of changing credit terms, then the profit embedded in the receivables balance will not be collected at the normal time and therefore will not be available for reinvestment. Thus an opportunity cost is associated with the profit amount since management implicitly has reinvested it in the outstanding accounts by extending the payments period.

The following illustration gives a brief detail for what has been discussed above A firm wants to evaluate a change in credit term by calculating RI. The current and proposed business conditions are as follows:

Current conditions		Proposed conditions	
Term of sales: cash	HUF	Term of sales: 2/10, n/30	HUF
Sales	54,000	Incremental sales	18,000
Variable costs	27,000	Incremental variable costs	9,720
Fix costs	1,200	Incremental fixed costs	250
		Incremental inventories	900

When the new items are implemented, 80% of the old customers are expected to discount and pay on the 10^{th} day. Only 30% of the new customers are expected to discount. Sales expected to be paid on the 40^{th} day after the invoice period. After-tax opportunity cost of fund is 12 %. The corporate tax rate is 18%. Should management implement the new credit terms?

Solution:

$$I_0 = \left[0.8x10\left(\frac{54000}{360}\right)\right] + \left[0.2x40\left(\frac{54000}{360}\right)\right] +$$
$$+\left[0.3x10x0.54\left(\frac{18000}{360}\right)\right]$$
$$+\left[0.7x40x0.54\left(\frac{18000}{360}\right)\right] + 900 = 4317$$

$$RI = \left[S_n(1-V) - w - f\right](1-T) - rI_0$$

$$= [18000(1-0.54) - 972^* - 250](1-0.18) - 0.12x4317$$
$$= 5269.52$$

Since RI is positive, the new credit policy should be implemented

*54000×0.02×0.80=864
*18000×0.02×0.30=108
972

Application of loosening credit

The incremental investment is redefined to exclude the first expression on the right hand side of the equation (3.20), that is, the expression $ACP_o \times ADS_n$.

$$I_0 = V \times ACP_n \times ADS_n + I - L \qquad (6.23)$$

The revised specification indicates the incremental investment in receivables and inventories, stated at cost that raises form new customers being granted credit. ***A loosing of credit standards has no effect on present credit customers since they already qualify*** under the old credit standards.

When the firm follows aggressive credit policy, some present customers will be affected and equation (6.23) is still applied.

6.4.5 The NPV with inflation

Under inflation conditions the expected cash flow must be adjusted for inflation induced, increased in product, factor, and financial prices[5]. Failure to adjust inflation and to raise product prices to offset increased costs results in reduced cash flow.

The incorporating of ***inflation adjustments for both cash inflow and cash outflow*** result in the following *NPV* model:

$$NPV = -I_0\left[1+\sum_{i=1}^{m}\frac{(1+d)^T-(1+d)^{T-1}}{(1+r)(1+i)^T}\right]+\sum\frac{F(1+u)^T(1-r)}{(1+r)(1+i)^T}\geq 0 \qquad (6.24)$$

Where

d: rate of increase in net investment per period because of inflation,

u: increase in net cash inflows per period because of inflation,

r: real rate of return required on investment,

i: financial market's perception of inflation

- $I_0(1+d)^T-(1+d)^{T-1}$ is the increase in net investment that is required in period T because of inflation.
- the incremental inflation investments at time 0, 1 and 2 are I_0, I_0d, and $I_0d(1+d)$
- In equation (6.24) the $F(1+u)^T$ shows the fact that the net cash inflows are growing over time at a constant rate of inflation of u percent per period.
- The discount factor $(1+r)(1+i)$ can be restored as $(1+k)$ where k is the required rate of return in nominal terms and is usually stated as $k=r+i$.
- The cross product term ri is often ignored since it is generally insignificant and r an i are estimates. Rate k is strictly greater than both d and u since it is a market-determined rate that incorporates any inflation premiums.

If cash flows are assumed to exist in perpetuity, then equation (6.24) can be simplified.

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[5] This heading is based on the article by J.A. Halloran and H.P. Lanser. "The Credit Policy Decisions in an inflationary," Financial management (winter1981): 31-38.

$$NPV = -I_0\left(\frac{k}{k-d}\right)+\frac{F(1+u)(1-r)}{(k-u)} \geq 0 \qquad (6.25)$$

The most general form of the model is derived form equation (6.25) by analyzing it where *NPV=0:*

$$F(i+r)(1+u)(k-d)-k(k-u)I_0 = 0 \qquad (6.26)$$

If no inflation exists in the factor, product or financial markets, then $u=d=i=0$, with the result that $k=r$. The model then reduces to the simple RI model as equation (6.20).

6.5 Collection policy

After credit has been granted, the firm has potential problem of collecting the cash when it becomes due, for which it must establish a collection policy. The firm's collection policy is its procedure for collecting account receivables when they are due. The effectiveness of this policy can be partly evaluated by looking at the level of bad debt expense. This level depends not only on the collection policy, but also on the firm's credit policy. Popular approaches used to evaluate credit and collection policies include the average collection period ratio and aging account receivables.

Popular collection techniques

When the receivable period is due, then the firm in general thinks about the following steps:

i. Sending letters to customers
ii. Making a telephone call to customers
iii. Personal visits
iv. Employing a collection agency
v. Taking a legal action against the customer

An approach, which could be very useful in certain cases, is to deny further credits to customers until they clear outstanding receivables. The main aim of collection efforts is to ask the payments of outstanding receivables when they are due and to minimize the loss originating from bad debts. The firm must avoid entering a conflict with those customers, who are solvent on the whole, though for some reason did not pay on the effective day. Strict and aggressive collection efforts may result in the decrease of future profit and sales as well as the loss of customers turning away to competitors offering more flexible collection policy.

The following results are the basic trade off that expected to result from an increase in collection efforts.

Variables	Direction of change	Effect on profit
Sales volume	Non or decrease	Non or negative
Investment in debtors	Decrease	Increase
Bad debt expense	Decrease	Increase
Collection expense	Increase	Decrease

The collection policy determines what type of collection effort practice and level must be available, in order to collect outstanding receivables. When determining which methods to use in its collection effort, the firm has to consider the amount of funds it has available to spend for this purpose. If the firm has a relatively small amount of money available for collecting past-due accounts, it must confine itself to less costly (and less effective) methods: such as *sending letters* and *making telephone calls*. If it has a larger budget, the firm can employ more aggressive procedures such as sending representatives to personally contact past-due customers. In general, the larger the company's collection expenditures, the shorter its average collection period and the lower its level of bad-debt losses. A business should increase its collection expenditures only if these marginal benefits are expected to exceed the amount of the additional collection expenditures.

Another approach is the categorization of **aging account receivable:** it is a technique that indicates the proportion of the account receivable balance that has been outstanding for a specified period of time. It requires that the firm's account receivable broken down into groups based on the time of origin. This breakdown is typically made on a month-by-month basis.

7. Developing manufacturing technologies and accounting

Advanced manufacturing technologies change the production process of many companies throughout the world. Today companies are becoming increasingly aware that excellence in manufacturing can provide a competitive weapon to compete in sophisticated worldwide markets. In order to compete effectively, companies must be capable of manufacturing innovative products of high quality at a low cost, and also provide a first-class customer service. The advanced manufacturing technologies give way to accountants that not only the working-in-process part of inventory need not necessary to be appeared in the balance sheet of the companies, but also the materials and finished goods.

The primary purpose of this chapter is to investigate the advanced manufacturing technologies and accounting innovation for inventory control and holding purposes.

There are a lot of problems of using traditional stock valuation and control system. Reliance on the EOQ formula had a further and more subtle insidious effect on production processes. Because people believed that the economics of lot sizes and set-ups had been well handled by the EOQ formula, little attention was paid to the time spent on set-ups or production orders were being completed on time.

But in response to increased costs, reduced profits, and intensifying world wide competition, the traditional inventory valuation and control system could not operate efficiently to achieve better profits, to improve qualities and reduce costs.

As a result, companies have reached for ways to streamline their operations and gather more accurate data for decision-making purposes. The result of this search has been the development of one powerful new philosophy Just-in-Time inventory systems. This helps the companies to reduce costs, increase efficiency and expand output.

The JIT system arose initially in the Toyota automotive plants in Japan in the early 1960s and is currently being used in a various industries including automotive, aerospace, machine tools, computer and telecommunications manufacturing.

One critical ingredient that distinguishes these philosophies from ones that were used in the past is the increasing focus by manufacturers on the manufacturing processes instead of the manufacturing results. The argument is that a result-oriented focus is probably suitable for mass production manufacturers but surely not for mass customization manufacturers. Unlike in mass customization, mass production system products are produced with the primary goal of minimizing operating costs with little focus on other performance indicators. It is a well-known fact that in a mass production system, operating performance is evaluated based on measures generated from traditional cost-based accounting data. These measures stress the importance of evaluating and monitoring the end-results of the system instead of the performance of the activities in the system. Consequently, other critical measures that could be used to reflect the overall system performance are generally ignored (Fry and Cox, 1989; Kaplan, 1990). Srikanth (1992) wrote, "After 15 years of studying productivity problems in dozens of companies, I have concluded that in most companies at any given moment, employees are working on the wrong task. The real problem is that workers think that they are working on the right task. Traditional measures create this problem." (Srikanth, 1992, 49). Articles written by Kaplan (1990, 1/1993, 9/1993), Maskell (1991), Plenert (1995), Hayes (1986), Fry (1992), Dhavale (1996), and Skinner (1969), also support this argument. These authors proposed new performance measures that should be used to reflect how a system is truly operated and to supplement or replace some of the traditional cost-based performance measures.

The new manufacturing environment of Just-in-Time production and Computer-Integrated- Manufacturing is introducing major changes in companies' operations and sources of competitive advantages. Management accountants will need to stay abreast of the operating changes occurring in their organizations so that measurement systems can be devised that will be consistent with the company's strategy and operations. The gap will widen between information produced for external financial statements and that required for internal management decisions and control. Much greater use will be made

of variety of operating measures for short/term feedback and evaluation. New ways to accumulate costs and apply them to responsibility centers and products will also evolve.

7.1 The causes of excessive inventory

When a business has excessive stocks of inventory on hand, the reasons are usually traceable to one of five factors.

1. The firm may believe that it needs large inventory to guard against being out of stock.
2. Errors may be made in production, resulting in stockpiles of raw materials or finished units. Such errors are frequently if a company's purchasing department is not coordinated with production or if a company's sales department fails to maintain timely communication with production.
3. Workstation may be uncoordinated, thereby requiring that goods in process be hold in storage areas for long periods awaiting the next production step.
4. The company's production department may insist on large batch sizes for parts, subassemblies and finished goods in the belief that large batches size are more economical to produce than small batches.
5. Workstations may be directed to produce parts that are not needed just to keep everyone busy.

Through the use of JIT approach, all five of these reasons for holding inventory can be eliminated with the result that inventories will no longer be a major factor in company's operation. Although initially conceived as a method of inventory control, JIT has since evolved into much broader concepts that impacts all aspect of a company's operating activities.

The Just-in-Time philosophy takes a more dynamic view of how to optimize production. The EOQ formula accepted existing or ordering costs as given, and it attempted to choose lot sizes that were optimal with respects to these parameters. With JIT approach, lot size

is not optimized; attempting to drive setup times to zero minimizes it. In JIT, production inefficiencies that must not be submerged or circumvented by creating mounds of inventory to buffer production stages from one another.

7.2 What are JIT main features in comparing to traditional system?

JIT manufacturing is best described as a philosophy of management dedicated to the elimination of waste. Waste is defined as anything that doesn't *added value to product.* The lead-time involved in manufacturing and selling a product consists of *process time, inspection time,* and *move time, queue time* and *storage time.* Out of these five steps, only *process time* actually adds value to the product. All the other activities add costs but not value to the product, and are thus deemed as *non-value added process* within the JIT philosophy. By adopting a JIT philosophy and focusing on reducing lead times, it is claimed that total costs significantly reduced. The ultimate goal of JIT is to convert raw materials to finished products with lead times equal to processing times; thus eliminating all non-value added activities.

The first stage in implementing JIT manufacturing techniques is to rearrange the factory floor away from a *batch production functional layout* towards a product layout using *flow lines.* With functional play layout products pass through a number of specialist departments that normally contains a group of similar machines. Products are processed in large batches so as to minimize the set-up times when machine setting is changed between processing batches of different products. Batches move via different and complex routes through the various departments, traveling ever much of the factory floor before they are completed. Each process normally involves a considerable amount of waiting time. In addition, such time is taken to transporting items from one process to another. A further problem is that is not easy at any point in time to determine what progress has been made on individual batches. Therefore detailed costs accumulation records are necessary to track working in process (WIP). The consequences of this complex routing process are high working in process levels and long manufacturing lead times.

The JIT solution is to reorganize the production process by grouping the products into families of similar products or components. All of the products in a particular group will have similar production requirement and routings. Production is rearranged so that each product family is manufactured in a well-defined production cell based on flow lines principle. In a product line flow specialists departments containing similar machines no longer exist. Instead, groups of dissimilar machines are organized into products or component family flow lines that function like an assembly line. For each product line the machines are place close together in the order in which they are required by the group of the products to be processed. Items in each product family can move from process to process more easily, thereby reducing work in progress and lead times. The aim is to produce products or components from start to finish without return to the stock room.

The traditional manufacturing approach has been to maintain buffer stocks to avoid workers becoming idle when the preceding production process breaks down or the next item to be processed is defective. Larger quantities of stocks are therefore maintained to protect against shortage caused by poor quality production and machine breakdowns.

In JIT environment, the emphasis is preventive maintenance and "doing the job right the first time", because a defective part or machine breakdowns disrupts the low of the production when all process are operating with a minimal level of inventory. A firm operating in a JIT environment becomes very aware of the fact that quality reduces costs because of defects stopping the production line, thus creating rework and possibly resulting in a failure to meet delivery dates. By adopting new quality awareness programs and implementing statistical process controls, many JIT firms have decreased defect rates substantially reduced inventories and enhanced the attributed of their products.

Long set-up and changeover times make the production of batches with a small number of units uneconomic. However, the productions of large batches leads to substantial throughput delays and the creations of high inventory production runs are required to process larger batches through the factory. The JIT philosophy is to reduce and eventually eliminate set-up times. If set-up times are approaching zero, this implies that there are no advantages in producing in batches. Therefore the optimal batch size can be one. With a batch size of one, the work can flow smoothly to the next stage without the need to store it and to schedule the next machine to accept this item. Small batch sizes,

combined with short throughput times, also enable a firm to adopt more readily short-term fluctuations in market demand, since production is not dependent on long planning lead times.

The JIT philosophy also extends to adopting JIT purchasing techniques, whereby the delivery of materials immediately precedes their use. By arranging with suppliers for more frequent deliveries, stocks can be cut to minimum. Requiring suppliers to inspect materials before their delivery and guaranteeing their quality can obtain considerable saving in material handling expenses. This improved service is obtained by giving more business to fewer suppliers and placing longer-term purchasing orders. Therefore, the suppliers have an assurance on long-term sales, and can plan to meet this demand.

Five key success factors are involved in the successful operation of JIT system. These success factors include improving the plant layout, maintaining a limited number of suppliers, and reducing the set-up time needed for production runs, achieving total quality control and developing a flexible work force.

7.3 The concept of JIT

The aims of JIT are to produce the required items, at the required quality and in the required quantities, at the precise time they are required. In particular, JIT seeks to achieve the following goals.

- Elimination of non value added activities
- Zero inventory
- Zero defect
- Batch size of one
- Zero breakdowns
- 100 % on time delivery service.

The new technology of JIT production is to achieve advantage over the traditional inventory valuation during processing the products. The costs in conventional inventory

valuation are higher because of their processing method, and handling raw materials and working in process as well as finished goods.

A firm operating a Just-in-Time inventory system would purchase only enough materials each day to meet the day's needs. Moreover, there would have no goods still in process at the end of the day, and all goods completed during the day would be shipped immediately to customers so nothing would have to be placed in finished goods warehouses. As this sequence suggests, "just in time" that raw materials are received just in time to go into production, manufactured parts and completed just in time to be assembled into products, and products are completed just in time to be shipped to customers.

The throughput time for any manufactured part equals the time interval between when a part is started into production and when the manufacturing process has been completed and the part is ready to be shipped to a customer.

Throughput time = processing time + inspection time + move time + queue time.

The Japanese manufacturers who have led the way in devising and implementing JIT system emphasize the importance of reducing through put time by rewriting the above equation as.

Throughput time = value-added-time + non-value-added-time.

Where value-added-time equals processing time, the times during which work is actually being performed on the product and non-value-added-time represents the time the part is waiting being moved, or being inspected. Many Japanese manufacturers also refer to the non-value-added-time as waste time to highlight that no-value is being created for the customer when the product is not being processed. The time has been wasted by inefficiencies in the manufacturing process.

Although few companies have been able to reach this ideal and therefore completely eliminate their inventories, JIT has made it possible for many companies to reduce inventories to only a fraction of their previous levels. The result has been a substantial

reduction in ordering and warehousing costs, and a stream lining of operation that has permitted these companies to meet competition that has global in nature.

The global measure for a JIT system is manufacturing cycle efficiency (MCE), throughput or lead-time. This can be shown as following as:

$$\text{MCE} = \frac{\text{value added time}}{\text{throughput}}$$

This ratio time to total lead-time provides an excellent indicator of how far the firm currently is from the ideal ratio of 1. If the MCE is less than 1, then non-value-added time is present in the production process. An MCE of 0.5 for example, would mean that half of the total production time consisted of inspection, moving and similar non-added-value activities.

Assume a B firm keeps careful track of the time to orders and to the production of goods. During the most recent quarter, the following average times were received for each unit or order:

	days
Wait time	17
Inspection time	0.4
Process time	2.0
Move time	0.6
Queue time	5.0

Goods are shipped as soon as production is completed. Let's compute

- the through put time
- the manufacturing cycle efficiency
- the delivery cycle time

Solution:

Through put time = Process time +Inspection time +Move time +Queue time

= 2.0 days + 0.4 days + 0.6 days + 5.0 days

= 8 days

Only process time represents value-added time: therefore, the computation would be:

$$MCE = \frac{2.0\ days}{8.0\ days} = 0.25$$

Since the MCE is 25%, the complement of this figure, or 75% of the total production time is spent in non-value-added activities.

The delivery cycle time is wait and throughput time. 17 days and 8 days are 25 days.

Many companies operating with a traditional manufacturing system a "hockey stick" pattern of productions and shipments are investigated each period. At the start of any measurement period, production rates are slow and steady with long setup times and large lot sizes leading to accumulation of a large amount of work-in-process (WIP) inventory. Near the end of accounting period, the emphasis shifts to finishing and shipping goods.

7.4 Accounting developments in TQC, JIT and CIM environments

Both Total Quality Control (TQC) and Just-In-Time (JIT) can be implemented without major new-equipment investment. In fact, recent experience has suggested that firms should not undertake major automation investments, particularly in computer-controlled manufacturing equipment, until significant progress has been made to reduce defects and to reduce the need to buffer successive operations with quantities of inventory. This experience indicates that organizations should first improve quality, and then automate. [30]

But the trend in manufacturing to digital computer-controlled production technology is inevitable. Companies are attempting to learn how to use the capabilities of robots, computer-aided design and manufacturing (CAD/CAM), flexible manufacturing systems (FMS), and ultimately, Computer integrated manufacturing (CIM) where the entire factor -from design to production – is linked together under digital control. Automatic guided vehicles (AGVs) transport products from one work cell to another without human intervention or assistance.

The new performance measures described for TQC, JIT and CIM environments should also be accompanied with changes in the company's cost accounting system. Companies that have long operated with a job order cost system for their discrete batch production processes have found it to be incompatible JIT production process. Basically, the demand for detailed vouchering and recording of WIP inventory becomes both needlessly expensive and uninformative when production flows through the factory on continual basis, especially in batch size of one or only a few units. Thus, the first accounting task when adapting to JIT environment is to shut off some existing measurements. The accounting system must be simplified at the same time that the production system has been simplified.

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[30] This experience has been reported in Steven M. Hronec, "The effect of manufacturing productivity on Cost Accounting and Management Reporting," *Cost Accounting for the '90s* (Montvale, NJ: National Association of Accountants, 1986)

All local efficiency measures must be terminated. With a continual JIT flow of production, it is contradictory to measure efficiency at the individual worker and machine level. Also, all piece work payments at the individual workers must be eliminated.
This step, by itself, greatly reduces the number of transactions reported per worker. With JIT, if worker or machine is not busy, the cause can not be attributed to an individual worker or machine. Either a problem exist prior to the work station – curtailing the supply of incoming parts to the station – or a problem has arisen downstream from the station, a problem signaled by the failure of the next station in line to consume the item previously produced. In either case, the worker has been instructed to stop producing and, perhaps, to leave the station to provide assistance where it is needed to restart the production process. The only efficiency measure will relate to the rate of output of the entire JIT line, and not to individual stations within the line. Perhaps, visual observations or group feedback will be sufficient to detect inefficient or poorly motivated workers. Western workers, accustomed to individual scrutiny from the legacy of Fred Taylor and the scientific management movement, may require some time to adjust to group norms and rewards.

Secondly, many costs previous included in general factory overhead can be traced to each dedicated JIT line. Cost of operations, materials, purchasing and support - including maintenance, engineering, quality assurance, and packaging- may be traced directly to JIT production line. Thus, rather than allocating these costs on some arbitrary basis, they can be charged directly to the line and made responsibility of the line manager. For product costing purposes, they can be applied to products based on cost per line hour charge.

The traditional three part for cost – labor, material, and overhead – can be reduced to two categories: materials costs and conversion costs. Materials costs (with associated overhead) are charged directly to the products, and conversion costs will be applied based on time spent in JIT line, as described above. Such a procedure permits companies to stop classifying labor as direct cost category. A less radical approach would have companies greatly reducing the number of different labor classifications, again permitting a considerable simplification in reporting.

Table 7.1

Cost of goods manufactured

Direct material:			
Beginning raw material inventory		$ 11,000	
Raw material purchase	$ 98,000		
Add: freight on raw material purchased	2,000		
Delivered cost of raw material purchased		100,000	
Raw materials available for use		$ 111,000	
Closing raw material inventory		3,000	
Direct materials used			$ 108,000
Direct labor			235,000
Factory overhead			
Indirect labor		$ 120,000	
Supervision		124,000	
Power		7,500	
Repairs and maintenance		9,200	
Factory taxes		45,000	
Factory supplies used		8,600	
Factory insurance expired		23,000	
Small tools written off		2,000	
Depreciation of machinery and equipment		160,700	
Depreciation of building		54,000	
Amortization of patents		16,000	
Total factory overhead costs			570,000
Total manufacturing costs			$ 913,000
Add beginning working in process inventory,			35,000
Total costs in process during the year			$ 948,000
Deduct closing working in process inventory,			47,250
Cost of goods manufactured			$ 900,750

Table 7.2

Cost of goods sold

Beginning finished goods inventory	$ 13,000	
Cost of goods manufactured (above table)	900,750	
Goods available for sale	913,750	
Less ending finished goods inventory	24,750	
Cost of goods sold		$ 889,000

Finally, the requirements for detailed vouchering of labor and WIP at the completion of each step in the production process can be eliminated. Once JIT production has been achieved, WIP inventory will be minimal. So the calculation for WIP becomes unimportant in the financial statements. Companies have replaced their raw materials and work – in – progress accounts with a single account: Raw and in process materials (RIP). All purchases are accumulated in RIP account. As items are completed and reach finished goods inventory (FG) or, preferably, are shipped directly to customers, the standard costs for the materials in the finished goods would credited – or back flushed (the word used to describe this JIT procedure) – to the RIP account. All the conversion costs (labor plus overhead) would be applied to the costs of finished goods production; none would be applied to in – process units. If there is no WIP inventory, then there is no need of calculating equivalent unit of productions. Reducing vouchering to only two points in the production process – incoming and outgoing – requires a very well controlled production environment, with minimal losses due to scrap and rework, and little build up of inventory between the start and finished of the production process.

Table 7.1 and 7.2 show the traditional preparation of cost of goods manufactured and cost of goods sold respectively, in order to prepare income statement. For the purpose of simplicity the component of inventory shown in the balance sheet are the material, working in process and finished goods. To calculate the working in process also needs reconciliation of equivalent of units. So the elements of table 7.1 and 7.2 in modern environments totally reduced in two elements, which are the RIP and FG.

The simplification from replacing an elaborate job – order vouchering system with two – vouchering point (RIP and FG) system are enormous. An even more ambitious goal for a JIT accounting system would be to have only one vouchering point. The receipt of successfully completed item would trigger all transactions. Based on this receipt, the system would recognize the material purchases that have recently occurred (to permit the production of this item) as well as the conversion cost incurred. The arrival of FG would trigger the payments – undoubtedly through electronic funds transfer to the suppliers – and the order for the next batch of material.

So the preparation of cost of goods sold in advanced accounting environment will be as follows:

Table 7.3

Purchases of raw materials	$ 100,000	
Raw in process materials (RIP) available for use		$ 100,000
Add finished goods inventory		789,000
Cost of goods sold		$ 889,000

Table 7.3 shows the calculation of cost of goods sold, but this is done in order to follow the procedure. If facts are taken, beginning raw material in process may not exist and the closing as well. What are purchased will be materials available for use, and this will be produced and shipped as finished goods for customers. As the result there will not be beginning finished goods and closing. So the finished goods will be the cost of goods sold, which will be deducted from sales to arrive at the total contribution margin.

It is remembered that the elements of current assets especially for manufacturing firms, the inventories not only include materials, but also the working in progress and finished goods. If the manufacturing firm applies the JIT system in its manufacturing process the inventory at the end of the accounting period will importantly be less than other firms which do not adopt the JIT system. The ratio of current assets and acid ratio will almost similar, because the finished goods are already sold so that they may be shown as accounts receivable or cash. As the result one or two elements of current assets will not be recorded on the balance sheet so that it will be easy to talk about liquidity. And the

daily operating cash may be higher than ever, since the firm manufactures through ordering process and the collection system will be easier. The companies sell or produce to sell, because it receives an order. An order is influenced by the quality of the services or products. Quality plays a great role in influencing elements of current assets as well as the liquidity.

As companies attempted to reduce inventories, many problems emerged in the factory that had formerly been hidden by inventory buffers: Quality problems, bottlenecks, coordination problems, inadequate documentation, and supplier's unreliability, among others. Without the discipline to achieve JIT operations, these problems would have remained unsolved. The rationalization of production process, the elimination of waste, and the more visible display of production problems that could be achieved under success JIT operation led to great reductions in material losses and great improvement in over all factory productivity.

JIT should be viewed broadly as a procedure helping companies to manage and reduce their total processing times. This viewpoint enables JIT to be applied throughout the organization, for service as well as manufacturing organizations. What prevents a task, once initiated from being processed continually until it is completed? The answer to this question provides the insights as to where non-value-added time can be eliminated from the system so that the organization can become more responsive to its customers and also lower its costs.

Companies must have the flexibility to cope with short product life cycles, demands for greater product variety from more discriminating customers and increasing international competition. World-class manufacturing companies have responded to these competitive demands by changing the product process in order to improve quality, reduce set-up times and increase manufacturing flexibility. They have also invested in advanced manufacturing technologies (AMT) such as computer-aided design, computer aided manufacturing, computer aid engineering, numerical control machine and flexible manufacturing systems.

Companies use to report the financial statements for internal and external users in the required period, and those companies apply the traditional inventory system (EOQ), show their previous year data and mislead the users. The inventory cost, which is presented in the Balance Sheet under current assets, carries last year's data. Since the inventory cost holds too many amounts, the current ratio's result will be higher. But inventory cost may not be liquidated at once like the cash. The first cause is the need for adjustments of the inflation when the traditional inventory system is used. Another thing is also Profit and Loss Accounts will show higher result, because the costs are transferred to the next year. As far as the companies which adopt the new philosophy concerns their financial statements and their financial ratios show according to the activities taken during the financial period.

So the companies those adopting advanced manufacturing technologies reduce their costs and can improve their output and their quality, and they can deliver their product with lower priced and suitable quality for the customers at the required time. And the WIP account will be missed in their report of financial statements

The changing manufacturing environment is creating a shift from treating financial figures as the foundation for performance measurement and control to treating as one among broader set of measures.

8. Conclusion

The main idea of the dissertation is to put an economic foundation, to investigate the complexity and important discussion of liquidity analysis, to reduce and develop the short-term financial planning as the pumping heart of the organization, to survey the pumping heart of the organization introducing the important of regression analysis and linear algebra to bridge the gap between short and long-term financial planning, to discuss the important of cash flow analysis in predicting the financial situation of the firm for the future to satisfy the going on principles. Therefore, these fields of activity represent the essential ingredients in deciding a coherence strategy for managing liquidity that is congruous with creating value for shareholders.

I know from my academic experiences that synergy is the whole of the pieces. To mean that the dissertation isn't concluded with the above main ideas, but attempts to investigate some of the pieces to give the whole picture, why do I give the title as analysis and decision-making in corporate finance for continuous operations? Therefore, the firms give credit to customers or/and take credit from suppliers, as a result, this type of trade credit will be as funds used by the firms when the firm grants credit for customers, and will be as a source of fund when the firm gets credit from suppliers. So to give the complete picture some of the problems of trade credit is examined and developed to investigate the firm when, how, which and what conditions should take into account to offer credit. Hence, to make analysis and decision of accounts receivables is supported by different models and assumptions at different situations with the help of illustrations to satisfy the synergy principles.

Of course, the analysis and decisions of account receivables is not only investigated under the analysis management of liquidity and management of working capital, but also as main topic differently. This is done to survey it deeply and widely in different corners and to present its importance as the function of liquidity, working capital and element of cash flow from operation that needs necessary managerial planning and control in terms of uninterrupted operations.

The last piece important element for the uninterrupted operation takes place in the dissertation is to show the different between the conventional inventory system, and the scope of advance manufacturing system that gives necessary information about the new style of balance sheet and income statements as well as it doesn't give hard times which inventory evaluation methods to choose and it presents that the JIT inventory more or less doesn't need inflation adjustment. Even though the selected topic is wide, I try to put the complete picture of the given headings.

While giving a brief discussion of the main topics I attempted to emphasis on the general economic factors of the financial environment. The firm's imperfect input and output markets influence the required state and the liquidity level. Market participants have the ability to directly affect the pricing of output and thereby influence market demand or/and supply. Management must use whatever information is obtainable to make decisions that endeavor to enhance the firm's value.

From the operation point of view, maximizing output level must be put in working order in a cost/benefit or a NPV framework that clearly includes the timing of cash flow. If management simply supposes that enough liquidity is present and is being properly managed, then the analysis most likely will be imperfect, and actual results will not be as planned. Each expenditure represents an investment of funds and must be evaluated in terms of its contribution to satisfying the cash flow - constrained shareholder wealth-maximizing objective -- or maximization of economic profit.

The operations during any cycle are highly influenced by the composition of the investment and time dimension. The technological rules of the production-sales process decide the necessary mixture of fixed and variable investment. If management is thought to disrupt this process is necessary, operating efficiency can be harshly damaged, with the result that the recovery values of many of the investments such as receivables and inventories may become of small fraction of their original value.

The analysis and management of liquidity is developed in the way to present the obstacles in analyzing and decision-making of liquidity during the operation and its trouble shootings as well as to put the suggested solutions.

The shortage of liquidity supply, relative to liquidity demand, is the most common reason for disrupting the cycle. Each cycle involves a certain amount of time, and within this time management invests most of its funds into fixed and quasi-fixed investment. Unfortunately, the obligations of the firm do not always match its revenue deriving operation.

The generation of accounting profits is not guaranteed that do not disturb the operation cycle of the corporate, because inventories are sold on account in practice. The firm at this point can be in cash-out position if lack of timing exists. This in turn leads to disturb the firm's operation. So solvency and values are dependents on cash flow not on the amount sold on credit and gained earnings.

The most important asset in portfolio of liquidity is cash in hand and cash in bank. Its function is to bridge the gap between cash receipts and cash disbursements that is why I give more attention in examining the cash cycle and other important elements of liquidity. The application of the residual income in terms of liquidity gives a better insight in the economic point of view that helps to bring the balance sheets, income statements and cash flow to common denominator. So all the procedure developed under this topic proves to show the necessary conditions to improve the firm's liquidity for achieving the principle of going concern or continuing as business entity.

Here then in the second topic, financial planning is developed in order to examine the different elements of working capital and the necessary strategy to manage them. Thus it is developed in the manner to demonstrate and investigate the necessary part in achieving the best planning and control process as well as harmonization of the workers to arrive at the same goal, that is, the firm to continue its operation with necessary amount of liquidity. Financing current assets is explained in more literatures with three different diagrams that is average, aggressive and conservative working capital financing differently, but in this dissertation it is presented in one diagram and arrived at the same conclusion. The percentage of sales provides with information that how much external financial is required to borrow. After calculating the external finance required, the methods of financing depends on many factors discussed under financing current assets and the financial flexibility of the firm as well.

The main purpose of the financial analysis and planning is to show how the statistical methods and linear algebra are used and to demonstrate how modern econometric methods can be used to analyze the dynamic adjustment process of financial ratios and obtain new insights into the use of financial ratios in financial analysis, planning and forecasting.

The analysis and management of cash flow is built up starting with the development of its history, its preparation and its importance in analyzing the liquidity of the firm. The life cycle of the business, the leverage buyout and financial flexibility are taken as the main points in analyzing and managing cash flow. The understanding and application of funds flow and cash flow analysis play a great role in the business environment in order to bring decisions closer to the economic concept of profit. The cash receipts and cash payments of a business during a time period should support the analysts and decision-makers evaluate 1). the ability of the firm to generate future cash flows 2) to pay dividends, 3) to meet its obligation, and 4) the issue of cash and non-cash investing and financing activities of the firm.

The dissertation works out with the problems in investing in accounts receivable and attempts to apply important models whether to grant credit or no. The investment in account receivables depends on the size of the firm and its credit policy. Therefore, important attention should be given when the firm grants credit, because it invests in another business entity. The firm supports the credit term in the hope of influencing the demand in order to increase sales and profit. If the sales are very slow in being collected, profitability will be of low quality. That is why I develop the equations for analyzing credit policy and simple NPV model for the concept of marginal revenue is equal or greater than marginal cost. The credit decision must be part of an integrative decisions based on marginal analysis that addresses changing sales, production, and inventory requirements, as well as spontaneous financing that may result.

The conventional inventory management has its effect specially in reporting the inventory in the financial statements. Let's raise the question that "does the end inventory balance hold its true value?" The answer is no, because different inventory methods of evaluation are applied and a result can be influenced due to inflation. The net income depends on

the method used for evaluation inventory to achieve higher or less profit at the given period of accounting.

The application of just in time system and other technological based production systems bring a new history to the accountants. In most countries the manufacturing firms have three types of inventories. The material, working in process and finished goods used to be reported in balance sheets. Where kanban and quality plays role in the manufacturing system, the inventories are reduced to one type of inventory which is raw material in process if it exists, but the target is zero inventories. Consequently the inventories are not encountered to inflation and the results will be closer to current economic situations. Hence, in the just in time environment the contract with suppliers is done for more than one year to supply them so that the adjustment for replacement cost of inventory is less important.

Before concluding the concept of the dissertation some aspects are to be highlighted. First of all, the empirical relationship of the concepts developed could be obtained from the data and information gathered by the annual report – which is to be prepared by the corporation in question. Second, the concepts worked out in the given dissertation are valid in terms of both actual and potential issues for uninterrupted operation. In other words, the idea developed supports the corporate decision making process not only by the application of actual data, but also by forecasting data using regression analysis, linear algebra, discriminant analysis and so on.

Third, the concept of the life cycle is particularly necessary for financial managers because business entities have different requirements as they mature. Early identification of these requirements helps the financial manger to do better policy decisions at the given stage of life cycle.

Fourth, the dissertation attempts in penetrating the appreciation of business organization. In order to do this an in even better established concept that is based on the different phase of the firm's life cycle, and on up-to-date financing techniques. The stage of life cycle concept is developed under the analysis of cash flow statements, but understanding the cash flow will not fully equip the analyst to predict whether a firm–whatever the stage

of development–will meet the challenge it faces. The financial flexibility-which is best measured by studying the flow of funds-is essential to meet those challenges.

The dissertation tends to contribute in the given field from the beginning up to the end headings in terms of its contents and construction to give better insights as also discussed in the above paragraphs. The idea developed under analyzing cash flow concerning the public and private owned firms, leverage buyout, the life cycle of the business and the financial flexibility of the firm has its own important in financial decisions of the firms.

In the sixth chapter, the discriminant analysis is introduced. It is also found in many finance literatures. Most of the models used in discriminant analysis look difficult to understand. As the result, without applying the dummy variables for the groups, the mean, error sum of the squares (ESS) and the product of the error sum of the two ratios for good and bad customers are calculated differently to reach at the parameters b_1 and b_2. In the discriminant model reaching the estimated b_1 and b_2 used in applying dummy variables should be tasted to determine whether they are statistically different form Zero or not. But the parameter developed in this dissertation need not to be tested. Since the bad and good group data are calculated differently it will be simple to substituted the mean, error sum of square and the product of the error sum of the square to reach at the required parameter and it is not necessary to apply the Cramer's rule that is why I can say it is easy to understand with the scope of statistics.

Finally, this dissertation also deals with inventory management. The traditional inventory management attempts to minimize three type of inventory: raw materials, working in process and finished goods inventory. Specially, these three items are presented in balance sheet of manufacturing organization as inventory. Where Just in Time is applied zero inventories and quality takes place as the important management process. If inventory exists, the only item can be shown in the balance sheet will be the raw in process materials. The raw in process material does not need calculation of equivalent units which makes difficult to calculate the inventories and factory overheads to reach at the amount of cost of goods sold in order to have the gross profit. Since inventories are monetary items, they are always influenced by inflations. An evaluation method of inventory takes place at the first stage of managerial accounting. The FIFO, LIFO and other methods do not have significant in the advanced manufacturing enterprises. So this

dissertation developed an idea of presenting inventory in the environment of developing technology.

The rest topics are also developed in the manner of the demand for liquidity for the improvement of the firm's continuous operation. For instance, the importance of defensive interval, the cash cycle and residual income have great contribution for the uninterrupted operation of the organization. The understanding of short-term financial planning, and financial planning and analysis are also play a great role in the economic activity of the firm in achieving the goal of the organizations. The manner of their constructions and arrangements give more sounds in order to fitful in the appropriate headings too.

To conclude in short, the analysis and decision-making of corporate finance for continuous operation should incorporate cash management and account payables, since I tempt to investigate, one or the other hand, the element of working capital deeply. The reason that cash management isn't examined separately, because directly or indirectly proved to be surveyed in most of the headings and it is discussed briefly in most financial literatures. The accounts payable is also not investigated as different topics, because I think that short-term liabilities are considered as the sources of funds and should be managed when they come on due. So the analysis and management of liquidity and the rest headings well come to accompany and fit them through out the dissertation.

Appendix A

Price changes and its effect in accounting

During a period of inflation, asset values recorded in the books at their original acquisition costs seldom reflect their current (higher) value. Understates asset values, in turn, results in understated expenses and overstated income. From a managerial perspective, such overstatement distort (1) financial projections based on adjusted historical time series, (2) budgets against which actual results are measured, and (3) performance data that fail to isolate the non-controllable effects of inflation. Overstated earnings may in turn lead to:

- Increase in proportion taxation,
- Request by shareholders for more dividends,
- Demands for higher wages by labor or their representatives,

Should a firm actually distribute all of its overstated (in the form of higher taxes, dividends, wage and the like), it may not have enough resources to replace specific assets whose prices have risen, such inventories and plant and equipment.

Failure to adjust corporate financial data for changes in the purchasing power of the monetary unit also makes difficult for statement readers to interpret and compare reported operating performances of companies. In an inflationary period, revenues are typically expressed in given currency with a lower general purchasing power (i.e. purchasing power of the current period) than applies to the related expenses. Expenses are expressed in currency with higher general purchasing power because they are typically based on the later consumption of resources that were acquired when the monetary unit had more purchasing power. Subtracting expenses based on old historical purchasing power from revenues based on current purchasing power results in an inaccurate measure of income. Conventional accounting procedures also ignore purchasing power gains and losses that arise from holding cash or equivalents during an inflationary period, which further distorts business performance comparisons for financial statement readers.

Absolute recognition of inflation's effect is therefore useful for several reasons:

- The effects of changing prices depend partially on the transactions and circumstances of an enterprise. Users do not have detailed information about factors.
- Managing the problems caused by changing prices depends on an accurate understanding of those problems. An accurate understanding will not develop until business performance is reported in measurement terms that allow for the effects of changing prices.
- Statements by managers about the problems caused by changing prices will be easier to believe when enterprises publish financial information that addresses those problems.

Even when inflation rates slow, accounting for changing prices is useful because (1) the cumulative effect of low inflation over time can be significant; (2) the distorting effects of previous inflation can persist for many years; and (3) specific price changes may be significant even when the general price level does not change much.

Types of inflation adjustment

Statistical series that measures changes in both general and specific prices do not generally move in parallel. Also, each type of price change has a different effect on measures of firm's financial position and operating performance and is accounted for with different objectives in mind. Hereafter, accounting for the financial statement effects of general price level changes is called the historical cost-volume purchasing power model. Accounting for specific price changes referred as the current cost model.

Historical cost-constant currency (general price adjustment)

Currency amounts that have not been adjusted are called nominal amounts. For example, during period of rising prices a long-lived asset that is on the balance sheet at its original acquisition cost is expressed in nominal currency. When its historical cost is allocated to the current period's income (in the form of depreciation expense), revenues, which reflect the current purchasing power, are being matched with costs that reflect the (higher) purchasing power of earlier period when the asset was bought. Therefore, nominal

amounts must be adjusted for changes in the general purchasing power of money to match them appropriately with current transaction.

Changes in general price level are measured by a price index that takes the form

$$\frac{\Sigma p_1 q_1}{\Sigma p_0 q_0}$$

Where

P = price of a given commodity,

Q = quantity consumed.

Price index numbers are used to translate sum of money paid in past periods to their end-of-period purchasing power equivalents (i.e. historical cost-constant purchasing power). The method used as:

$GPL_c / GPL_{td} \times$ nominal amount $= PPE_c$

Where

GPL = general price index

c = current period

td = transaction date

PPE = general purchasing power equivalent.

When transactions occur uniformly throughout a period (such as revenue from the sale of goods or service) a short-cut price level adjustment can be used. In expressing revenue as end-of-period purchasing power equivalents, rather than price level adjusting each day's revenue, one could multiply total annual revenues by the ratio of the year-end index to the average general price level index for the year.

Let's briefly review the conventional notion of enterprise income. Form a traditional perspective, income is the portion of a firm's wealth position (i.e. net asset) that could be withdrawn during an accounting period without decreasing the original wealth position. Hence, conventional accounting measures income so that it equals the maximum amount that can be withdrawn from the firm without reducing its original money capital.

Once it can not be assumed stable prices, the conventional measure of income may no longer accurately measure a firm's disposable wealth. Assume that the general level of

price rise by 21% during a year. To keep abreast of inflation, a firm that begins the year with $ 200 would want its original investment to grow to at least $ 242, because it would take that much to buy at year's end what $200 would have bought at the beginning. Suppose that, using conventional accounting, the firm earns $100 after tax. Withdrawing $100 would reduce the firm's end-of-period wealth to $200, less than to keep abreast of inflation $242. The historical cost-constant purchasing power model takes this discrepancy in to account by measuring income so that the firm could pay out while maintaining as much purchasing power at the end of the period as the beginning.

To illustrate, assume that an X merchandiser begins the calendar year with $ 200,000 in cash, which is immediately converted into salable inventory 10, 000 compact discs of a Latin America rock star at a unit cost of $20. The entire inventory is sold uniformly during the year at a 50% markup on cost. Assuming no inflation, enterprise income would be $100,000, the difference between ending and beginning net assets ($300,000 - $200,000), or the revenue minus expenses (cost of CDs sold). In this case, withdrawal of $100,000 would leave the firm with $200,000, as much capital as the start of the year. Hence, the objective of conventional accounting is to maintain a firm's original investment.

Assuming instead that the period experienced a 21% inflation rate with the general price level (1.21 at year end) averaging 1.10 during the year. Inflation adjusted income would be measured in thousands as follows:

	Nominal dollars	Adjustment factor	Constant dollars
Revenues	300	1.21/1.10	330
- Expenses	200	1.21/1.00	242
Operating income	100		88
- monetary loss	---		30
Net income	100		58

In the preceding calculations, sales took place uniformly during the period, so they are adjusted by the ratio of the end-of-year index over the year's average price index. Since

the inventory sold during the year was bought at the beginning of the period, cost of sales would be adjusted by the ratio of the year-end index to the beginning-of-year index.

Where did the monetary loss figure come from? During inflation, firms will have changes in wealth that are unrelated to their operating activities. These arise from monetary assets or liabilities, claims to receive or obligation to pay a fixed amount of currency in the future. Monetary assets include cash, account receivables, and notes receivables, which generally lose purchasing power during periods of inflation. Essentially all liabilities are monetary, except for deferred revenue (where obligation is to provide goods or services, rather than pay money). The monetary liabilities generally give rise to purchasing power gains during inflation. In the given example, the firm received and held cash during a period when it lost purchasing power. As inventory was sold for cash balance, cash was received and held uniformly throughout the year. The firm's cash balance at end of the year $330,000, resulting in a $30,000 loss in general purchasing power, (a monetary loss).

In contrast to conventional accounting income, using the historical cost-constant purchasing power model is only $58,000. However, a withdrawal of $58,000 assures the firm 's end-period wealth $242,000 ($300,000 - $58,000) giving it as much purchasing power at the end of the year as at the beginning. Thus, the objective of the historical-constant purchasing power model is to preserve the general purchasing power of the firm's money capital ($242,000).

Current cost adjustment

The current cost model differs from conventional accounting in two major respects. First, assets are valued at their current cost rather than their historical cost. Second, income is the amount of resources that firm can distribute during a period, while maintaining its productive capacity or physical capital. One way to maintain capital is to adjust a firm's original net asset position (using appropriate specific price indexes or direct pricing) to reflect changes in the asset's current cost equivalent during the period. Continuing the previous example, the transaction of hypothetical merchandiser under the current costing framework can be illustrated as follows (in thousands).

Assets	= Liabilities	+ Owners' equity
Cash	Inventory	capital
1. 200		200
2. (200)	200	
3. 300		300 revenue
4.	80	80 OE revaluation
5	(280)	(280) expenses

Line 1 depicts the financial statement effects of the initial $200,000 investment into the firm. Line 2 shows the exchange of cash for inventory. Assuming a 50% markup, line depicts the sale of inventory for cash, which increases owners' equity by the same amount. To reflect the current cost of sales, the merchandiser increases the carrying value of inventories 40%, as depicted in line 4. The offset to the 40% write-up of inventory is an $80,000 increase in owners' equity revaluation account. This adjustment does two things. The owner's equity revaluation amount tells statement readers that the firm must keep an additional $80,000 in the business to enable it to replace inventories whose replacement costs have risen. The inventory revaluation, in turn, increases the cost of resources (cost of sales), line 5. Thus, current revenues are matched against the current economic cost (not the historical cost) incurred to generate those revenues. According to the example, current cost-based net income is measured as $300,000 - $ 280,000 = $20,000. The current cost profit of $20,000 is the amount the firm could spend without reducing its business operation.

Assets and liabilities are non-monitories if they are not to be paid by currency. Inventories and long-term assets are non-monetary items so that they are restated for price changes. Most liabilities are monetary items, while owner's equity is considered non-monetary item. As the result shareholders' equity is calculated as the difference between total adjusted assets and liabilities.

Under current cost accounting sales are revealed at current price levels when sold so no need for adjustment. Cost of sales needs adjustment, because materials and labor cost were incurred in proceeding periods. It is shown here how to adjustment the cost of goods sold for typical merchandise:

Beginning inventory (at historical cost)	xxx
+ Purchases (at historical cost)	xxx
- Ending inventory(at historical cost)	xxx
+ Realized holding gains	xxx
= Cost of goods sold (at current cost)	xxx

Realized holding gains (losses) are the difference between the current cost and historical cost at the time of sale. Holding gains arise from holding assets, which increase in value with inflation.

In general, current cost accounting provides that current assets and liability accounts be adjusted to show coexisting costs so that they maintain a closer relationship to cash-out expenses.

Some important ratios under the current cost method

The working capital ratios under the current cost method reveal more information about the short-term solvency of the firm.

The current cost method shows insights into the problem in analyzing the components of ROE. The ROE under this method provides with the notion of economic asset value. The return on sales, ROS, (net income/ sales) during inflationary periods indicates serious problems with operation. Lower current cost net income occurs because costs increase as a result of higher costs of replacing fixed assets and inventories. Firms with substantial assets or older assets are more influenced by inflation than firms with few assets and new assets. Depreciation expenses increase under current cost approach in order to reflect the replacement cost of the fixed assets. LIFO is better in showing current cost in the income statement and ROS. The increment of tax rate is caused by inflation because income taxes are depended on historical costs rather than current cost.

Investment turnover is the ratio of sales /total assets. The amount of net assets in the turnover ratio is augmented for any unrealized holding gains. The unrealized gains happen on non-monetary assets, such as inventories and fixed assets, because inflation

increases the cost of replacement of such asset. Where as such realizable gains are not realized under present GAAP and are not used to historical costs.

The application of the method of adjustment depends on the regulation of each country and internal regulation of the firms. We are witnesses to the inflation in Central Europe and other developing countries now days. We also observed that many countries do not adjust the costs to the given inflation period. Even though two methods of adjustment are developed, the current cost approach is offered to achieve results corresponding to economic soundness.

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